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**Linking school milk with smallholder dairy development strategy:
Thai experience and design considerations
for a pilot project in Bangladesh**

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Prepared for

**The Food and Agriculture Organization
Regional Office for Asia and the Pacific
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Table of Contents

Acknowledgements	iii
Executive summary	iv
1 Background and objectives of the study	1
2 Review of nutrition and feeding programmes in Bangladesh with a focus on school milk	3
2.1 National food and nutrition policy and programme	3
2.2 Bangladesh School Feeding Programme of the World Food Programme	5
2.3 Bangladesh School Nutrition Programme of Land O'Lakes and Tetra Pack	8
2.3.1 Genesis	8
2.3.2 Implementation and governance	10
2.3.3 Impact of the programme	13
2.4 School milk programme of Arla Foods	14
2.5 Health, Nutrition and Food Security project of CARE-Danone Japan	14
2.5.1 Grameen Danone	14
2.5.2 CARE-Danone Japan project	17
2.5.3 Problems in the cold chain and a new product innovation	17
3 A review of dairy development and school milk programme in Thailand	19
3.1 Milk production and import growth 1961-2008	19
3.2 Breed and feed development	21
3.3 Promotion of dairy farming	22
3.4 Promotion of dairy cooperatives	22
3.5 Milk market and price prior to introduction of school milk programme	24
3.6 School milk programme as a new market outlet	26
3.6.1 Background and evolution	26
3.6.2 Governance of the programme	29
3.6.3 Outcome of the programme	32
4 Implications of policies and implementation modalities of school milk programmes in Thailand and Bangladesh	34
5 Design considerations for a pilot school milk project for Bangladesh	37
5.1 Choice of sites for the smallholder dairy development project and implications for choice of site for the school milk pilot	37
5.1.1 An overview of the Community Livestock and Dairy Development Programme and lessons for the smallholder dairy development project	37
5.1.2 Marketing strategy for the smallholder dairy development project and implications for link with the school milk pilot	42
5.2 Organization and management of the school milk pilot	45
5.2.1 Factors to be considered in deciding implementation modalities	45
5.2.2 Choice of schools and grades to be served	46
5.2.3 Management structure for the project	48
5.2.4 Organization and implementation of the project	49
References	52
Appendices	54

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However, the authors alone are responsible for the views expressed in the report.

The Authors

Executive Summary

The FAO Regional Office for Asia and the Pacific is coordinating the implementation of two linked dairy projects in Bangladesh, Myanmar and Thailand – one on improving productivity and market access of smallholder producers, and another on linking school milk with smallholder dairy development. The link between the two projects is to test a hypothesis that ‘local milk for local schools’ can serve as an important incentive for stakeholders to develop smallholder dairy as well as reduce malnutrition among children. The purpose of this study was to review past and ongoing nutrition and school feeding programmes in Bangladesh and Thailand and draw lessons for designing a pilot school milk project in Bangladesh linked to the smallholder dairy development project.

A review of nutrition and school feeding programmes in Bangladesh reveal that there are some nutrition programmes to address food security of poor people but virtually nothing on school feeding with or without milk in that domain. There is an on-going school feeding programme implemented by the WFP in collaboration with the Ministry of Primary and Mass Education in a number of districts, which was originally started as a pilot project. Under this programme primary school children are provided with micronutrient fortified biscuits as snacks to reduce malnutrition, enhance school attendance, reduce drop out, and improve school performance. The government has recently decided to expand the coverage of the programme with own resources.

A pilot project on school milk was implemented by Tetra Pack, a food processing giant, and Land O’Lakes, a large US NGO, for a number of years in three upazilas in Jamalpur district. This was based on USAID granted commodity aid (powder milk, wheat, edible oil) to facilitate school feeding to address malnutrition. The aid granted milk powder was sold to local milk processors and UHT milk was bought back to serve primary school children. The primary interest of Tetra Pack in sponsoring this project was to test the acceptability of UHT milk among Bangladeshi dairy processors and consumers as a vehicle to create business opportunities for its milk processing technology. Since marketing of pasteurized milk requires good transportation network and refrigeration facilities, the market for pasteurized milk outside Dhaka is limited. Tetra Pack saw this as an opportunity for UHT milk. Being dependent on imported powder milk, the project had no link with smallholder dairy production. The project ended when USAID commodity grant was stopped and by that time Tetra Pack’s primary objective was also achieved; a number of dairy processors have created UHT processing facility and the market for this product is expanding, especially outside Dhaka. There are a number other small projects in which milk is sporadically distributed among children but none of these can be classified as school milk programme *per se*.

In Thailand, dairy development prospered under strong Royal patronage and government policy support since the early 1960s. Throughout the 60s, 70s and 80s, dairy development efforts were facilitated by dairy breed and feed development, promotion of dairy farming as an alternative to crop farming for income and employment creation, promotion of dairy cooperatives for organizing milk collection, processing and marketing alongside private dairy processors, and tax and tariff and investment policy to protect domestic dairy sector from international competition. Consequently milk production increased rapidly and share of domestic production in total consumption also increased. However, by the late 1980s, producers started facing problems in marketing milk especially when processors tended to import powder milk due to low world market price, so producers protested several times

about lack of stable market and remunerative price for raw milk. On the other hand, in spite of rapid income growth in the economy over nearly two decades, malnutrition was widespread especially among children even though a school lunch programme was in place. About that time, FAO had drawn the attention of policy makers through its school milk advocacy programme about the virtue of school milk to address malnutrition among school children.

Against this background, and based on the experiences of two pilot projects on school milk ran in Bangkok, under a new Royal patronage, the government launched a school milk programme in 1992 with full government funding alongside an ongoing school lunch programme, to provide dairy producers an outlet for a share of their milk output and to reduce malnutrition among school children. During the first three years, only kindergarten students were provided with milk, other grades were included gradually reaching the 6th grade in the 17th year after inception of the programme. Since 1992, the dairy sector experienced rapid growth in terms of number of dairy farmers, dairy cattle population, yield and output, number of dairy cooperatives and processing capacity, and a stable dairy income growth. The school milk programme played a key role in this process. The journey has not been always smooth though, as the programme had to undergo several changes in terms of its governance and management during the last two decades to address issues related to milk collection from producers, contracting processors for delivery to schools, milk prices along different points in the supply chain, quality of school milk and administration of the school milk budget. The important aspect of these changes were that these were done in consultation with all the stakeholders including the country's Cabinet, the highest policy making body.

The Bangladesh component of the smallholder dairy development project and the pilot school milk project are planned to be implemented in partnership with the Grameen Motsho Foundation (GMPF), a member of the Grameen Bank family of organizations. GMPF had implemented a Community Livestock and Dairy Development (CLDDP) project with UNDP funding during 1999-2005 in several districts in northwest Bangladesh among landless and poor households already engaged in an aquaculture programme to improve livelihood through increased livestock income. In case of dairy, the project helped landless and poor households to acquire dairy cows by providing credit, promoted crossbred cattle through providing artificial insemination service and concentrate feeds to increase milk yield, provided a compulsory insurance service to reduce risk from death of cows and heifers, created milk collection and chilling facilities to provide a stable market outlet at remunerative price. The project had apparently made positive impacts on several counts though no systematic impact evaluation was done. After the project finished in 2005, GMPF reduced dairy activities in most project sites but continued other livestock related activities with accumulated savings and other own resources. The physical facilities e.g. feed mills, milk collection and chilling plants were retained by GMPF, most of which remained idle or highly underutilized since 2006.

It is understood from FAORAP and GMPF that the new smallholder dairy project will be implemented in three districts – Sirajganj, Kurigram and Thakurgaon- where GMPF have ongoing livestock activities with or without dairy and have some of the physical assets carried over from the CLDDP. Additional assets will be acquired as required.

Based on a review of the status of the current dairy and other livestock activities and facilities of GMPF, it appears that the school milk pilot project may be implemented in either Nimgachi in Sirajganj district or Ranishankail in Thakurgaon district or in both the locations.

However, the possible nature of link between the smallholder dairy project and the school milk project will depend on the milk marketing strategy to be adopted in the smallholder dairy project. Several milk marketing options and their pros and cons for linking the school milk pilot have been discussed in detail. In short the options are as in the table below. A choice has to be made after careful consideration of each option.

	Milk marketing option for the smallholder dairy project	Implication for the school milk pilot
1	Sell chilled milk to a large processor e.g. Rangpur Dairy, Aarang Dairy, Pran Dairy under time bound contract minus required amount for school milk.	Link with school milk pilot is unsuitable as chilled milk is unsuitable for delivery and for school feeding.
2	Add mini pasteurization plant to existing chilling plant at each site to serve school milk, sell remaining chilled milk to others	Link with school milk pilot need to recognize that there is no tradition of drinking cold milk among children, so implication of drinking cold milk and cold chain to supply safe cold milk need to be addressed.
3	Create a central facility for pasteurization collecting milk from three project sites.	Link with school milk need to consider points made in relation option 2 and additionally this option will be more expensive
4	Add mini UHT plant to chilling plant at each site or at a central place for both school milk and outside sale	Highly suitable for school milk pilot. But need large initial investment and may not be competitive with other UHT processors
5	Sell chilled milk to a large processor having UHT facility e.g. Rangpur Dairy, Aarang Dairy or Pran Dairy under time bound contract and buy required quantities of UHT milk for the school milk pilot.	Highly suitable for school milk pilot. May be difficult to find a buyer for chilled milk having UHT facility on reasonable terms. Cost of collection of raw milk and delivery to processor will be high and “local milk for local school” philosophy may be unrealized.
6	Sell chilled milk to Grameen Danone under time bound contract and buy back required quantities of fortified yoghurt or Fermented Milk for school milk pilot.	Fermented milk highly suitable for school milk pilot with minimum logistic for distribution. Fortified yoghurt also suitable for school milk subject to establishment of delivery cold chain. Establishment of delivery cold chain for fortified yoghurt for school milk likely to be difficult and expensive especially if school pilot is located in Thakurgaon due to distance. “Local milk for local market” may not be visible as it will get diluted with Grameen Danone’s overall processing operations.

1 Background and Objectives of the Study

The Food and Agriculture Organization, Regional Office for Asia and the Pacific (FAO RAP), is in the process of implementing two complementary regional dairy projects with funding from the CFC as well as FAO RAP and the participating countries. The projects are :

Project 1: Smallholder dairy development in Bangladesh, Myanmar and Thailand : improving the bargaining power and sustainable livelihood of smallholder dairy farmers through the enhancement of productivity and market access in dairy (CFC, 2010).

Project 2: Enhancing milk consumption and livelihoods through school milk programmes linked to smallholder dairy operations in Bangladesh, Myanmar and Thailand (FAO, 2010).

In Bangladesh, the projects will be implemented in partnership with the Grameen Motsho O Pashushampad Foundation (GMPF), an organization operating within the umbrella of the Grameen Bank – a specialized bank wellknown for its innovative micro-credit without collateral. It is envisaged that in project 1, productivity improvement and options for enhancing market access will be tested and school milk programme may be one of the outlets for a portion of the marketed milk. While in project 2, the efficacy of school milk as a market outlet for the development of smallholder dairy sector will be tested. The envisaged link between the two projects is that the school milk programme will be piloted in the same area(s) where the productivity and market access enhancement project will be implemented assuming that “local milk for local schools” may serve as a powerful incentive for smallholder dairy development efforts by actors or stakeholders in the dairy value chain from producer to consumer.

In order to help design the pilot school milk project in Bangladesh, this study was conducted with the following objectives or terms of reference:

1. Review ongoing and past nutrition programmes in Bangladesh giving special attention to dairy products based programmes targeted at school children.
2. Conduct a thorough review of the school milk programme in Thailand and incorporate lessons from this review in design of pilot interventions in Bangladesh (see point 5 below)
3. With respect to points (1) and (2) above, examine the role of public policy, costs and modalities of implementation, and linkages to private sector and draw lessons for design and implementation of school milk programmes based on local smallholder milk production
4. Identify a matrix of indicators which are critical to effectively piloting and monitoring local interventions. These could include complexity of design and monitoring, institutional capacity to implement and monitor these programmes, commitment to the idea (both public and private), required infrastructure and logistic support, cultural preferences, etc.

5. In partnership with GMPF, identify suitable locations for piloting interventions in Bangladesh within the CFC supported smallholder dairy development project areas and develop a strategy for piloting interventions

In order to fulfill these objectives, a review of literature was conducted on school feeding programme with or without milk in general and those in Thailand and Bangladesh in particular. Key stakeholders involved in dairy policy and projects, especially with respect to school milk programme, in Bangladesh and Thailand were consulted; these included government departments and other organizations, universities and research institutions, dairy cooperatives, dairy processing companies and NGOs, local government authorities, schools, and dairy farmers. Discussions were also held with senior managers of GMPF, the agency responsible for implementation of the Bangladesh component of the regional projects, especially about their past dairy operations, current activities and facilities in the context of plans for implementation of the new projects. And above all, discussions were held with FAO RAP officials responsible for coordination and execution of the regional project. A list of people met and organizations visited including mission itinerary is given in Appendix A.

The report is organized as follows. In section 2, nutrition and feeding programmes in Bangladesh with a focus on school feeding are reviewed. In section 3, the development of the dairy sector in Thailand and the role of school milk programme in the development process is reviewed. In section 4, public policies on dairy and school milk, and their implications for dairy development in Thailand and Bangladesh are compared. In section 5, issues to be considered for designing the proposed pilot school milk project in Bangladesh are discussed and on that basis, a framework with alternative options for implementing the pilot project is suggested.

2 Review of Nutrition and Feeding Programmes in Bangladesh with a Focus on School Milk

Poverty and malnutrition have been pervasive problems in Bangladesh since her independence. Child malnutrition reflected in high rates of underweight, stunting and wasting has declined over time but is still above the WHO thresholds for very high levels, typically found in emergency situations (Table 2.1). Key macro- and micro-nutrient deficiencies especially Vitamin A, iron, zinc and iodine, and low birth weight and maternal undernutrition continue to be major public health problems in the country. These problems impair physical and mental development of children in general and also create nutrient-specific outcomes such as night blindness due to Vitamin A deficiency, and overall increase in vulnerability to other health and disease problems.

Table 2.1 Status of poverty and child malnutrition in Bangladesh

Poverty Indicators	1990-95	2010
Poverty headcount ratio	59.0	31.5
Poverty gap ratio	17.0	6.5
Population below minimum level of dietary energy consumption (%)	28.0	20.0
Under 5 child malnutrition indicators	1993-94	2007
Percent of children underweight for age (underweight)	56.3	41.0
Percent of children short for age (stunted)	54.6	43.2
Percent of children underweight for height (wasted)	17.7	17.4

Source: GOB, 2011a

Given the above, reduction of poverty and malnutrition is a major goal of national economic development policies and programmes. Additional specific programmes and projects have been implemented to address malnutrition. A review of the literature, and programme and project portfolios on feeding and nutrition revealed that in order to address problems of malnutrition the following programmes/projects have been implemented in the past and some are still active:

- National Food and Nutrition Policy and Programme
- Bangladesh School Feeding Programme of the World Food Programme
- Bangladesh School Nutrition Programme of Land O'Lakes and Tetra Pack
- School Milk Programme of Arla Foods
- Health, Nutrition and Food Security Project of CARE-Danone Japan

A detailed discussion on these follows.

2.1 National Food and Nutrition Policy and Programme

Nutrition issues are addressed in national food policy and national health policy. The National Food Policy 2006 was adopted on the basis of assessment of past achievements and status of food security at that time (FPMU, 2006a). The goal of the national food policy is

“ to ensure a dependable food security system for all people of the country at all times “ and the objectives are:

- to ensure adequate and stable supply of safe and nutritious food,
- to ensure purchasing power of the people to increased food accessibility, and
- to ensure adequate nutrition for all (especially women and children).

Thus the objectives captured the three dimensions of food security – availability, access and nutrition or utilization – as implied in the definition of food security adopted at the World Food Summit 1996 (FAO, 2008).

Various strategies and actions are in place to achieve the three objectives. Activities under objectives 1 and 2 have nutritional implications and consequences but those are not nutrition programmes *per se*. Under objective 2, in order to enhance accessibility of food, one of the instruments used is public food distribution and one of its functions is to supply food grains to various food-based safety nets. Food grains distributed through this channel involve relief, subsidized sales and food for work programmes but normally no feeding programmes except in case of emergencies such as during or after a severe flood or cyclone. Thus food distributed through the safety net programmes is not generally feeding programmes though they have nutritional implications. The core nutritional goals are addressed through objective 3 of the food policy, i.e. to ensure adequate nutrition for all especially women and children, and by the national health policy.

The National Food Policy 2006 (FPMU, 2006) and the National Food Policy Plan of Action 2008 -2015 (FPMU, 2008) have updated the nutrition goals and actions based on the 1997 National Food and Nutrition Policy and the National Plan of Action for Nutrition, and embedded them in the NFP PoA with outputs and outcome indicators to monitor progress. The NFP PoA includes eight key areas of intervention that include long term planning for balanced food, balanced and nutritious food at minimal costs for vulnerable people, nutrition education on dietary diversification, food fortification and supplementation, safe drinking water and improved sanitation, safe quality food supply, women’s and children’s health, and promotion and protection of breast feeding. Again none of these is a feeding programme *per se* though they have nutritional implications.

The main goal of the National Health Policy is to achieve sustainable improvement in health, nutrition, and family welfare status of the people, particularly of the poor and vulnerable groups, including women, children, and elderly. Nutrition issues received public policy attention since the mid 1970s through the establishment of the Institute of Public Health Nutrition (IPHN) in 1974 to provide technical support to formulate policy and strategy for nutrition related activities and programmes and also to conduct research, training and surveillance, and the Bangladesh National Nutrition Council (BNNC) in 1975 to develop policy & strategy. But these institutions in the past mainly contributed through data generation and awareness building without any action programmes and without functional integration with mainstream health programmes. This has changed in the mid 1990s when for the first time the health policy also has put a strong emphasis on nutrition issues and these are addressed through a number of programmes and projects.

The Health, Nutrition and Population Sector Programme (HNPS) operated two projects namely National Nutrition Programme (NNP) and Micronutrient Supplementation. (MNS). Facility based services were provided through the MNS and community based services for basic health and nutrition were undertaken through NNP. These included treatment of acute malnutrition in children through micronutrient supplementation (Vitamin A, iron, zinc,

iodine) , iron-folate supplementation for women, and antenatal care and counseling during pregnancy (GoB, 2011a; GoB, 2011b). The National Strategy for Infant and Young Child Feeding in Bangladesh is focused on direct interventions targeted to child nutrition during the “window of opportunity” from pregnancy through the first two years of a child’s life. The International Code of Marketing for Breast Milk Substitutes regulates activity of private sector marketers to ensure that they do not unethically market breast milk substitutes to mothers, which can thwart progress towards appropriate breastfeeding practices (GoB, 2011a; GoB, 2011b). The National Policy for Arsenic Mitigation, and the corresponding 2004 Plan of Action was designed to address issues of arsenic poisoning.

A variety of other stakeholders are implementing supporting and smaller-scale interventions related to direct nutrition inputs. Other health and nutrition interventions (such as immunization, iron-folate supplementation, etc.) are implemented through the public health system and private healthcare providers. Interventions to improve infant and young child feeding are currently implemented with varying intensity and scale and by a number of NGOs and other stakeholders across Bangladesh.

Among a long list of projects and activities, only vulnerable group feeding programme has a direct feeding activity involving supplementary feeding. Supplementary food is additional food to normal meals and snacks given to the targeted beneficiaries every day, except Fridays and Government holidays, in the Community Nutrition Centres. The food kept in *putty* packets consists of roasted and powdered rice and lentils, molasses and oil. One large *putty* packet (600 Kcal) is 4 times bigger than a small packet (150 Kcal) distributed to each pregnant woman having BMI <17. The criteria for selection of beneficiaries for supplementary feeding were revised in September 2007. Accordingly, pregnant women of households with absolute poverty would receive 4 small *putty* packets per day from the 4th month of pregnancy for 150 days; severely malnourished children would receive 2 small *putty* packets per day; and first degree and second degree malnourished children would receive 1 small *putty* packet per day from 7 to 24 months. Once the recipients reach a threshold level of nutrition based on predetermined indicators such as BMI and other parameters of nutritional status, they are considered to have graduated in terms of basic minimum nutritional status and are excluded from the programme and new entrants are registered.

All other activities under the NNP and MNS involved either distribution of tablets or similar materials e.g. Vitamin A tablets or deworming tablets once or twice a year or services and promotional activities to improve awareness. One of the awareness building activity called **School Nutrition Education Programme** is aimed at improving the awareness of teachers and students about better nutrition through training, and inclusion of nutritional topics in school curriculum, for which additional grants are made to the schools to complement the main budget received from the Education Ministry. However, NNP and MNS run as projects and they do not cover the entire country

There was evidence of lack of coordination and duplication of activities between HNPS and NNP projects so they are currently under reorganization into a single entity called National Nutrition Service with the following objectives:

- To implement and mainstream comprehensive package of nutrition services to reduce maternal and child nutrition and ensure universal access
- To develop and strengthen coordination mechanisms with key sectors (especially Ministry of Food and Disaster Management, Ministry of Agriculture, Ministry of

Livestock and Fisheries, Ministry of Local Government and Rural Development and Cooperative) to ensure a multi-sectoral response to malnutrition

- To strengthen the human resource capacity to manage, supervise and deliver nutrition services at the different levels of the health system
- To strengthen link with central MIS
- To conduct operations research for ensuring an evidence-based response.

Implementation of this integrated service is planned within the Sixth Five Year Plan period - 2011-2015 (GoB, 2011a) and there is no direct feeding programme under this service, nearly all its activities are focused on capacity building of health and nutrition service providers and awareness building among the citizens, especially the poor and vulnerable groups.

2.2 Bangladesh School Feeding Programme of the World Food Programme

School feeding programmes are common in industrialized countries. The main objective of such programmes is to provide meals or snacks to reduce short-term hunger in the classroom so that the students can concentrate and learn better without disrupting class routines. Since primary and secondary education is compulsory in most developed countries, regularity in attendance is usually expected even then school feeding is considered to ensure it further. In developing countries, school feeding programme is not as common as in the developed countries but where it exists, the objectives are often multiple e.g. reduction of short-term hunger and malnutrition, attaining regularity in attendance, and better academic performance which may be poor in the absence of feeding programmes.

In Bangladesh, some government schools in the urban areas introduced in-school distribution of snacks (*tiffin*) as early as the 1950s and in most cases students required to pay a monthly fee for the snacks. School lunch proper is rare if exist at all. The GOB has devoted a significant share of its budget for over a decade to providing incentives to families to send their children to school. In an effort to increase primary school enrollment of children from poor families, the GOB had launched the Food for Education (FFE) programme in 1993. The FFE programme provided a free monthly ration of food grains (rice or wheat) to poor families in rural areas if their children attended primary school. Ahmed (2004) referred to a number of studies that showed that the FFE did raise primary school enrollment. The Primary Education Stipend programme, which replaced the FFE programme in 2002, provides cash assistance to poor families if they send their children to primary school. The GOB also provides cash assistance to girls in secondary schools through four secondary school stipend programmes. These conditional cash transfer programmes aim to increase the enrollment and retention rates of students in primary and secondary schools throughout rural Bangladesh. A recent study indicates positive influence of these programmes on educational attainment (Ahmed, 2004). As a result of these educational investments, Bangladesh has made commendable progress in the education sector over the past decade. Over 90 percent of children eventually enroll in school, and few disparities now exist between boys and girls. A World Bank report on poverty in Bangladesh notes that Bangladesh and Sri Lanka are the only countries in South Asia that have achieved gender as well as urban-rural parity in school enrollments (World Bank, 2002).

While the achievements of the education interventions have been impressive in terms of enrolment and attendance, academic achievement is disappointing, especially in primary schools. Hunger is a likely reason. Widespread under nutrition in Bangladesh remains a

critical barrier to children's learning. So introduction of school feeding programme was considered as having a good potential to improve children's learning performance. And, in July 2002, in order to diminish hunger in the classroom as well as to promote school enrollment and retention rates, the Government of Bangladesh (GOB) and the World Food Programme (WFP) launched the School Feeding Programme (SFP) in several districts covering chronically food insecure areas of the country. The goals of the programme were to increase school enrollment and attendance by providing supplementary food as an incentive; reduce school repetition and dropout rates, improve attention and learning capacity by reducing short-term hunger, and thereby improve school achievement. The programme also aimed to improve nutritional status and health by reducing micronutrient deficiencies and providing a protein/calorie supplement. The WFP also intended to use the SFP as a mechanism to encourage schools to provide water from tested, arsenic-free tube wells, and to provide separate toilet facilities for girls, as the lack of such facilities was viewed as a potential barrier to girls' school enrollment. The WFP also hoped to encourage greater participation by women in the School Management Committees (SMC) and more active involvement of the SMC in school activities in general.

The programme was implemented through distribution of fortified biscuits to elementary school children in the targeted schools six days a week during the school year. The SFP provided a mid-morning snack consisting of eight fortified wheat biscuits to some one million children in approximately 6,000 primary schools in highly food-insecure rural areas in a number of districts, plus four slum areas in Dhaka City. The WFP provided contracted local biscuit manufacturers with imported wheat and micro-nutrient mix, and acted in an advisory capacity to improve hygiene and quality control. WFP-imported wheat earmarked for SF was bartered against biscuits from contracted local factories. The biscuits were delivered to WFP's partner NGOs and stored at regional warehouses before sending to schools. The selected service-providing NGOs were responsible for preparing delivery plans, checking attendance and distribution, inspecting the schools for good storage practices, hygiene and sanitation, and for reporting back to WFP. For each school, a school management committee (SMC) — comprised of parents, teachers and school officials — oversaw the distribution process. Each SMC had at least one female member. SMCs, NGOs and GOB officials were provided with training to operate the SF programme (management, food storage and handling, hygiene and sanitation, etc.).

At a cost of U.S. 6 cents per packet of eight, the biscuits provided 300 kilocalories and 75 percent of the recommended daily allowance of vitamins and minerals (vitamin A, zinc, foliate, and iron). These biscuits are produced locally by confectionary factories on contract with the programme at a cost of 0.56 US cents a packet. Since there are 240 school days in a year, this amounts to US\$13.5 per child per year. The cost includes storage, transportation, vitamin mineral premix, freight, quality assurance, and NGO service provider cost for monitoring, reporting, and distribution.

In 2003, the SF programme covered 1.21 million primary school children in 6,126 schools (3,748 GOB and 2,378 NGO schools) in 36 upazilas in 9 districts of Bangladesh (rural areas of 32 upazilas and urban slums in 4 upazilas in Dhaka City). From 2002 to 2004, a total of 160,000 metric tons of wheat were allocated to the SF programme, for a total estimated cost of US\$27.1 million to the WFP and US\$3.2 million to the GOB. The wheat was to be bartered for local production of about 46,000 metric tons of biscuits.

Rogers et al (2004) reported the results of a mid-term evaluation of the impact of the project based on a baseline survey conducted in May-June 2002 and a follow up survey in July-August 2004. Ahmed (2004) reported the findings of a comprehensive evaluation based on a number of surveys at the household, school and community levels in addition to achievement tests for the schoolchildren, carried out in late 2003. The studies concluded that school feeding programme in highly food-insecure rural areas improved the diet and nutritional status of children. After rice, SFP biscuits were the most important source of energy, protein, and iron in the diet of programme participants. Participating students also appeared to share SFP biscuits with younger siblings and sometimes other household members. Sharing created an interesting spillover effect: energy from SFP biscuits accounted for 7 percent of total energy intake of children ages two to five in beneficiary households in the rural areas.

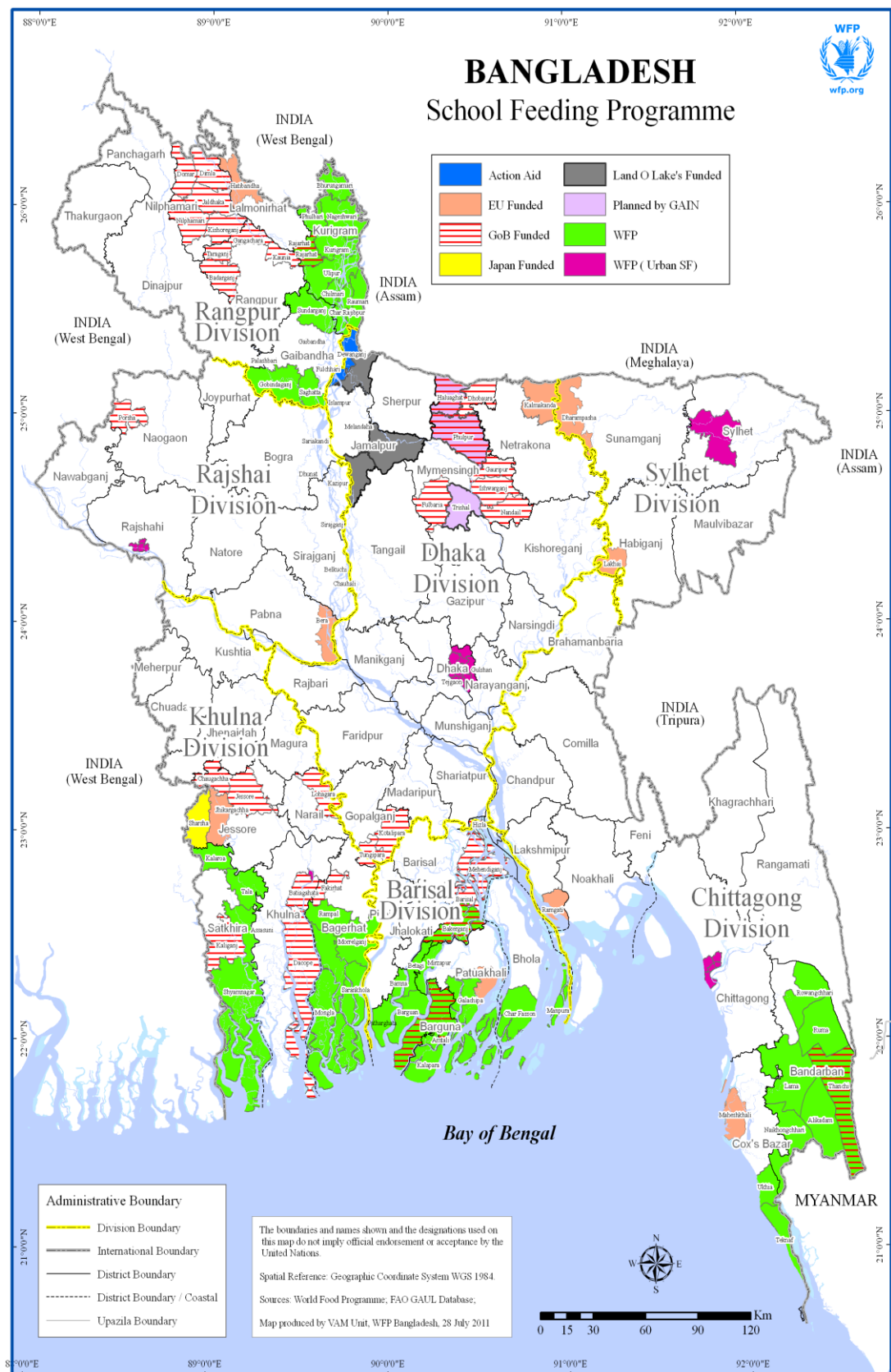
The children's calorie intake from biscuits had a statistically significant positive impact on their daily calorie intake and body mass index (BMI). When contribution of other actors were controlled for, SP had raised school enrollment by 14.2 percent, reduced the probability of dropping out of school by 7.5 percent, and increased school attendance by about 1.3 days a month. An extremely high percentage of mothers reported several positive effects of the SFP on their children. They noted that those children's interests in attending school and concentration on studies had increased; they were livelier and happier than before, and their incidence of illness had declined.

Given the positive impact, School Feeding was integrated into the WFP Country Programme, as well as the subsequent Emergency Operations and the Refugee Operation in Cox's Bazar. In total, approximately 1.1 million primary school children are currently supported under these three programmes in the formal and non-formal 7,500 Government and non-government schools in 43 upazilas in 14 districts. The school feeding programme is being implemented under the country programme 2007-2011 jointly with the Government of the Peoples Republic of Bangladesh in various high food insecure areas of the country, where education performances are low. In addition to the FFE, under country programme WFP also assists primary schoolchildren under the Protracted Relief and Recovery Operation (PRRO) to support refugees along the border with Myanmar. Currently a total of 9,000 school age camp children have been receiving school feeding assistance under PRRO (www.wfp.org).

Following the WFP model of providing 75g of fortified biscuits along with the essential learning package, a number of projects are being implemented. A UNICEF-GOB joint project on Hard to Reach Urban Working Children is being implemented with CIDA and SIDA funding in 27 upazilas in 6 districts covering over 73,000 students. The MPME is implementing a project with Saudi funding in 33 upazilas in 14 districts covering 1.2 million students and another EU funded project is being implemented in 10 upazilas in 10 districts serving 200,000 students. The geographical areas covered by these and other programmes are shown in Figure 2.1

Other programmes are in the pipeline. The Government of Bangladesh was scheduled to launch its own school feeding programme in poverty-prone areas in January 2011. Initially, 1.2 million primary school children were planned to receive fortified biscuits. The government planned to allocate US\$90 million from its own resources, over a period of three and half years for the implementation of the programme. Based upon the government request, WFP has been providing technical assistance which is focusing currently on issues such as project design and management, selection of NGOs and biscuits factories,

Figure 2.1 School feeding programmes run by various agencies in Bangladesh



Source: www.wfp.org

procurement, quality control, logistics, monitoring and evaluation and a feasibility study to identify an alternative local food basket. The estimated cost of the technical assistance over three years is US\$4.5 million. The implementation of this programme has been delayed due to inadequate preparation.

Global Alliance for Improved Nutrition (GAIN), a UN sponsored organization, is also planning to implement a pilot project to distribute various fortified foods to the school children in 3 upazilas in one district covering 17000 students. Based on experiences in India, the project also includes provision for school meals in the form of *Khichuri* – a mixture of cereal, pulses and vegetables.

2.3 Bangladesh School Nutrition Programme of Land O'Lakes and Tetra Pack

2.3.1 Genesis

Child malnutrition impairs physical and mental development that can't be compensated in later years even with better nutrition. Since milk is a highly nutritious food – rich in protein, fat and 14 of the 18 essential micronutrients- school milk has been used as a tool to address this problem since the second world war in Europe and North America. In recent years, this has been piloted and adopted often with donor support in a good number of developing countries having high incidence of child malnutrition. Since 2000, FAO has been performing a complementary role by creating awareness about the value of milk and the virtue of school milk programme.

Tetra Pak is the world's leading supplier of food processing, packaging and distribution systems. It is one of the world's leading suppliers of high quality hygienic packaging for milk, known as ultra high temperature (UHT) treated milk. Because of its longer shelf life without refrigeration, it is easy to transport, store and distribute UHT milk in both urban and semi-urban or rural areas thereby expanding the scope for expansion of milk market in countries with poor infrastructure (roads, electricity, and refrigeration facilities). The size of the processed milk market in many developing countries is fairly small and pasteurization is the

main processing technology used. In order to expand its business opportunities in such countries, Tetra Pak has often adopted non-conventional approaches and initially invested in creating demand for its technology. Initiation or participation in school milk programmes developed by others to address child malnutrition has been one of the strategies used by Tetra Pak since the 1960s. In some case, support has been extended for increasing milk production through better technology and management and also improving market access. In 2002, this approach was formalized as a business strategy through its Food for Development Office, and entry stage promotional investment has been usually categorized as investment under its corporate social responsibility programme. (Barker and Hinsch, http://www.tetrapak.com/Document%20Bank/FfDO/BSNP_TetraPak_casestudy.pdf).

Under such an approach, in partnership with Land O'Lakes (LOL), a large American NGO having long term experience in the dairy and rural development programmes in both the USA and developing countries, Tetra Pak implemented a school milk programme in Indonesia since 2000. The project not only benefited 500,000 primary school students when fully operational, it also created a substantial business for Tetra Pak technology and materials for processing school milk and later for processing milk for the commercial market. Based on

that experience, Tetra Pack identified Bangladesh as a potential target for business because of its large population with milk drinking tradition but a widening gap between its domestic production and demand which is met by import. Here also Tetra Pack adopted school milk with UHT milk as a strategy for entering the sector, and together with LOL applied to the USDA's Global Food for Education Initiative, a pilot project which donated surplus agricultural commodities from the United States for school feeding programmers in developing countries. In 2002, USDA donated nearly 35,000 metric tons of commodities including wheat, non-fat powdered milk and soybean oil to LOL for a three year period. Responsible for the execution of the programme, LOL used a portion of the donated powdered milk for the school milk programme while the majority, along with the other commodities, was monetized to cover the programme's operating expenses. The Government of Bangladesh (GoB) supported the school feeding programme by waiving all taxes on nonmonetized commodities that would directly benefit the population of the country. Tetra Pak linked LOL with local milk processors, provided technical know-how and quality hygienic packaging. GOB approval for the project was procured from the NGO Bureau, which administer and oversee all NGO activities in the country, and consent of the Ministry of Education and Culture was obtained by the NGO Bureau.

2.3.2 Implementation and governance of the programme

The pilot project was implemented in four upazilas in Jamalpur district during 2002-2009 with a break in 2004 (see below). The present LOL office in Dhaka informed that all hard and soft copy materials on the project, especially on its implementation and governance mechanism, were lost or destroyed when the office of LOL was shifted to a new site sometime back. However, an account of the project is narrated below based on verbal account of the knowledge and experience of some staff of LOL having institutional memory and some involvement in the project, and some supplementary general information derived from a public awareness document available on the websites of GAIN, Tetra Pack and LOL (http://www.tetrapak.com/Document%20Bank/FfDO/BSNP_TetraPak_casestudy.pdf; <http://www.fas.usda.gov/excredits/FoodAid/FFE/gfe/congress2003/asia.htm#Bangladesh> : *Land O'Lakes, Inc.*; www.Gain.org).

The project was implemented in four upazilas - Jamalpur Sadar, Sharishabari, Islampur, Melandaha - in Jamalpur district. The implementation procedure followed was as below.

- LOL was responsible for execution of the project. In consultation with local civil and school administration, all government approved primary schools and madrashas as well as BRAC's non-formal schools in the four upazilas were chosen. Jamalpur Sadar had both rural and urban schools. School Management Committees and school teachers were informed and educated about the objectives and operational mechanism of the project and about their individual and collective responsibilities in assuring proper implementation of the project activities. Beneficiary students were also exposed to the project's objectives and operational mechanism, about health and hygiene, about the nutritional value of milk and precaution necessary to avoid health hazard from drinking milk at school, and about their own roles in making the project a success. An additional Parents' Committee was formed to ensure wider participation and monitoring of activities.
- MOUs were signed with private dairy processors (Pran and Aarong) to make 200 ml UHT milk packets and a biscuit manufacturer to make packets of 40 gm micronutrient fortified biscuits. Tetra pack provided UHT and biscuit making technologies to these

companies. Since USDA supply of commodities came in one or two lots, those on receipt from the USDA were delivered to the local processors and valued at an agreed price. Against that value, manufactured UHT milk made of powder milk and fortified biscuits made of what flour and other ingredients were delivered by the manufacturers at upazila warehouses at an agreed price every week based on requisition from the LOL Dhaka office. Thus no cash transaction was required so long as there was balance from the delivered commodity value.

- Until local manufacturers were ready to produce UHT milk, it was imported from Thailand for distribution during the initial stage of the project (the exact duration of this arrangement is unclear).
- Contracts were made with small local businesses, mainly transport service providers, for regular once a week delivery of milk and biscuits to the schools at fees which was reviewed periodically (supposedly there was a focus person at the school to receive the materials).
- MOUs were signed with BRAC and three local NGOs (Padakhep, Usha and EFERD) for overseeing and monitoring the distribution, accounting, record keeping, and reporting to LOL. Each local NGO was responsible for monitoring a number of schools and BRAC had an overall supervisory role.
- Each student and each teacher was given a milk packet and biscuit packet every day of the effective school days for immediate consumption at the school. As a complement, deworming tablets were provided twice a year to reduce illness and improve the uptake of nutrients from food consumed at school and at home. At the end of each week, requisition for the next week would be sent by the school to upazila warehouse by taking into account any unused balance during the current week. The upazila warehouses would send the collated requisition for that upazila to LOL office in Dhaka which would further send the requisition to the manufacturing companies.

In 2002, at its peak, about 263,000 students and nearly 5000 teachers in about 967 schools were served by the project. Several problems were faced or observed during the first year of implementation. These are:

First, the most important problem faced or observed was duplication in student enrolment: some students enrolled at a primary school as well as at a madrasa or at a primary school/madrasa as well as at a BRAC non-formal school. The government-run food for education and later cash for education programmes served as incentives for this malpractice as poor people with support from school teachers and school management committees tried to derive benefits from all conceivable sources and ways. This practice led to the delivery of more packets of milk and biscuits than were actually required and these packets ended up in unintended hands. Since both the products were attractive to the target population, it was difficult to instill discipline and a fair distribution system.

Second, although consumption at the school was expected, it was difficult to enforce the procedure as some packets were taken home to share with other siblings or members of the family. This was quite natural given the level of malnutrition and poverty on the one hand and attractiveness of the products supplied on the other. Even better off beneficiaries did not abstain from this practice.

Third, most schools had no extra room or space for use as a store for safe keeping of the milk packets and biscuits during the week, so usually these were stocked at a corner of the teachers' room. Apart from the risk of pilferage, the physical conditions of the rooms in some schools were poor, so there was the risk of quality deterioration when stored for several days.

Fourth, access roads to many schools were of poor quality and transportation (rickshaw, rickshaw vans, baby taxis etc) used to carry the products from upazilla warehouses were

also sometimes not of appropriate design and quality. These twin problems sometimes led to damages to some product packets, which required careful scrutiny before distribution to avoid health hazard of the children. Although ultimate rate of rejection was not very significant as a result of this problem, the intensity of monitoring and checking required turned out to be high.

In order to address the problem of double enrolment, at the end of year one, in consultation with various stakeholders, BRAC's non-formal schools was dropped from the project as these accounted for most of the double enrolment. Consequently in 2003, the number students and teachers served by the project dropped respectfully to about 175, 000 and 3250. Precautionary and corrective measures were taken to address other problems and adjustments were made with time and experience.

Even though the USDA had originally committed a three year grant, no delivery was made in 2004 apparently because of some changes in USDA policy on commodity grant for school feeding due to depleted food stock and also because of some procedural complexities. Consequently supplies to the schools had to be stopped in 2004. After negotiations, the grant was renewed for 2 years and deliveries were made during 2005 and 2006. But some changes were made in the project area coverage. Jamalpur Sadar included both urban and rural schools, and in general incidence of poverty there, especially in the urban areas, was lower. So it was replaced by Madarganj upazila in 2005. As a result, number of students served dropped to about 150,000 which also had helped to deal with the budgetary limitations.

In 2006, a new grant was received for 2007-2009 period. No further grant could be procured so the project ended in December 2009.

2.3.3 Impact of the programme

Reportedly a baseline and an end of project survey were conducted but systematic analysis to assess impact of the project was not done. The content of the survey also could not be gathered. However, it has been claimed that attendance rate in Jamalpur district increased from 43% in 2002 to 82% in 2009 as the incentive of receiving milk and biscuit increased enrolment and decreased absenteeism, and academic performance also radically improved as the students no longer needed to struggle in empty stomach.¹ It has been also mentioned that the project created a demand for about 25, 000 litres of milk every school day, created about 500 jobs for local people providing various services and ensured food security for 2500 family members, and created employment of about 175 BRAC and other NGO staff for monitoring and supervision of the project activities (Barker and Hinsch http://www.tetrapak.com/Document%20Bank/FfDO/BSNP_TetraPak_casestudy.pdf; www.Gain.org).

One of the most important beneficiaries of the project was Tetra Pack itself as it had already achieved its primary objective, that is to show to private dairy processors in Bangladesh the

¹ A LOL monitoring report mentioned various impacts of the project including school attendance, student performance, student behavior etc during the first year of the project but the figures and narration are at times contradictory and some are exaggerated (<http://www.fas.usda.gov/excredits/FoodAid/FFE/gfe/congress2003/asia.htm#Bangladesh>: Land O'Lakes, Inc.)

suitability and acceptability of UHT milk to Bangladeshi consumers. Their link with school milk project encouraged them to create their own UHT processing facility to serve the commercial market. By 2009, private processors created UHT processing capacity buying Tetra Pack technology and reportedly 18000 tons of UHT milk was already sold that year. Other processors are also creating UHT capacity alongside pasteurization facilities. So Tetra Pack had no interest in further investing resources to expand the size of the pilot school milk project. Even though in its 2003 progress report, LOL had expected that “effective collaboration with the Government of Bangladesh and other donors will contribute to project sustainability”, LOL and Tetra Pack did not invest or did not have any time and resources to undertake any advocacy work with the government bureaucracy to persuade the government to adopt school milk as a programme to address malnutrition. If that was done, perhaps with government initiative and support a new enlarged grant could be procured from the USDA even in a situation of reduced food stocks for school feeding programmes.

Tetra Pack realized that the expansion of its business opportunity would depend on the market for UHT milk which in turn would depend on increased availability of raw milk. But raw milk supply was inadequate due to low productivity of indigenous cows, scattered smallholdings having meager marketed surplus and poor quality of product. So instead of further investment in school milk programme, Tetra Pack became more interested in working with CARE Bangladesh and Pran Dairy in an ongoing dairy value chain project to increase smallholder productivity and market access. Then partnered with Pran dairy to expand its network of milk collection centres to collect milk from smallholders as well as provide them technology and management training for increasing productivity.

2.4 School Milk Programme of Arla Foods

One of the biggest exporters of milk powder in Bangladesh is the Danish-Swedish dairy giant Arla Foods, which has supplied between 2500 to 8000 tonnes of milk powder to Bangladesh per year in recent years. Arla Foods manufactures Dano, the leading powder milk brand in Bangladesh accounting for over 20% of powder milk sales in the country. Dano milk powder is usually imported in bulk and repackaged for retail sales.

A recent study published by Action Aid, an international NGO, found that European subsidized export of milk powder seriously adversely affects the dairy sector in Bangladesh, especially its smallholder producers as in many other developing countries where EU exports milk powder. Arla Foods being the largest single exporter to Bangladesh bears major responsibility for the poor state of the dairy sector in the country, though it is not recognized by the company (Curtis, 2011; Tibbet, 2011).

The company presents itself as a socially responsible company and have some activities in different countries under its CSR domain. One of its CSR activity is called “Children for Life”, which provides one glass of milk a day to around 800 children in three countries – Vietnam, the Dominican Republic, and Bangladesh. The project costs DKK 1 million (€ 134,228), which amounts to 0.08% of the company’s net profits in 2010. In Bangladesh, the project begun in 2010 and “provides teaching, food and milk” for 235 pupils at a school in the slum area of Korail on the outskirts of Dhaka (Arla Foods, 2009). No further details about the objectives, management, governance and impact of the project in Dhaka could be gathered except the information that Arla's primary donation to the project is its own imported milk powder. The company’s CSR report is explicit in stating that this CSR project

is intimately related to its sales strategy. Its 2010 report states: “The Children for Life project was conceived ...by the department responsible for sales of milk powder across the world. ...Apart from the three countries in which the Children for Life project is currently running, Nigeria and China are also important markets for Arla Foods’ milk powder. For this reason, there are plans to set up similar projects there” (Arla Foods, 2009). Yet, a 2007 study for the FAO states: “School milk feeding schemes based on imported pre-packed milk are seen as counter-productive to sustainable smallholder dairy development” (Haque, 2007).

2.5 Health, Nutrition and Food Security project of CARE-Danone Japan

It is necessary to discuss the activities of Grameen Danone before discussing the CARE-Danone Japan project because of an indirect connection between the two and also a possible link with the proposed pilot school milk project under discussion.

2.5.1 Grammen Danone

Grameen Danone (GD), a dairy enterprise, is a member of the Grameen family of enterprises. It is registered as a social business in which the investment is shared by three parties – 50% by four enterprises of the Grameen family of enterprises, 20% by Danone and 30% by Danone Community (a fund created by Grameen Bank and Danone for investment in social business globally). It is a social business in the sense that its activities are targeted to the poor smallholder milk producers, and poor consumers and traders, and any profit earned by the enterprise will not be taken back by the investor shareholders rather it will be reinvested to expand the size of the enterprise for the benefit of its target constituency. These terms may be changed at a future date depending on circumstances.

It has built a dairy processing plant in Bogra town with a capacity to process 10 tons of raw milk per day into micro-nutrient (Vitamin A, zinc, iron, iodine) fortified yoghurt (called *Shakti Dai*) for selling mainly in rural areas primarily among poor children 3-12 years of age with a view to improve their nutrition and health. The enterprise currently procures 60-80% of its milk requirement from 370 farmers in Shariakandi upazila through three collection centers, two of them having chilling facilities; the remaining 20-40% is procured from milk traders in other upazilas. The aim is to collect the entire requirement from smallholder producers with 1-2 cows, who are also provided with some inputs at cost price and technical advice to increase productivity. While other large dairy processors pay producers weekly or fortnightly and may refuse to buy small quantities or extra milk during flush season or at any time, GD pays cash daily at the time of collection, guarantees to buy every day any amount. Even though GD’s purchase conditions are somewhat better than those of other processors, GD still faces problem to keep seller loyalty whenever price offered by other processors is increased, which they do more frequently than GD, to ensure adequate supply of milk.²

² It is unclear if the producers supplying milk to GD understand what social business is and what is there for them in GD’s business apart from being milk suppliers. The same point can be made about other staff and actors related to GD’s operations because unless all stakeholders in a social business understand its objectives, operational mechanisms and buy into it, the distinction between a social and conventional profit oriented business will be blurred.

The collected milk is processed into fortified yoghurt and packed in 60g cups which have a shelf life of 6 days if stored at 2-6°C. About 80-90% of daily capacity is utilized. Currently about 40% of the output is sold in the rural areas and 60% in the urban areas – mainly in Dhaka and Chittagong. Retail price per cup is Taka 8 in Dhaka and Chittagong and Taka 7 in Bora and elsewhere. In Bora district, rural sales are channeled through a network of Rickshaw Van Sellers (RVS) and Shakhty Ladies (as they are called due to their selling of *Shakhty Dai*). The RVS have a rickshaw van on which a Danone provided cool box is mounted and the van driver is supplied daily by GD marketing staff about 1000 cups of yoghurt. He receives a basic salary from GD plus a commission on the volume sold daily. The RVS supplies 100-200 cups of yoghurt to each of 5-8 Shakhty Ladies who stock the cups in a cool bag supplied by GD, and sell by walking in the villages, markets and near schools. They also get a commission from GD and profit margin from the retail price.

Outside Bora district, the rural sale is conducted mainly through CARE-Bangladesh's network of village women retail traders. In each of about 80 upazilas in various districts, CARE has a hub consisting of one entrepreneur (more like a small wholesaler) who is assisted by CARE to stock and supply on credit a mixture of consumer goods to about 30 mobile retailer ladies who in turn sell these items in villages and markets. The retailers get commission and pay back after selling. CARE purchases some amount of *Shakhty Dai* from GD and supplies to about 40 of its 80 hubs for selling through its rural women retailers.

Sales of *Shakhty Dai* grew steadily on a yearly basis since launching the product in 2007 (Table 2.2) but with significant monthly variation within a given year (Figure 2.2).

Table 2.2 Sales of *Shakhty Dai*, 2007-2010

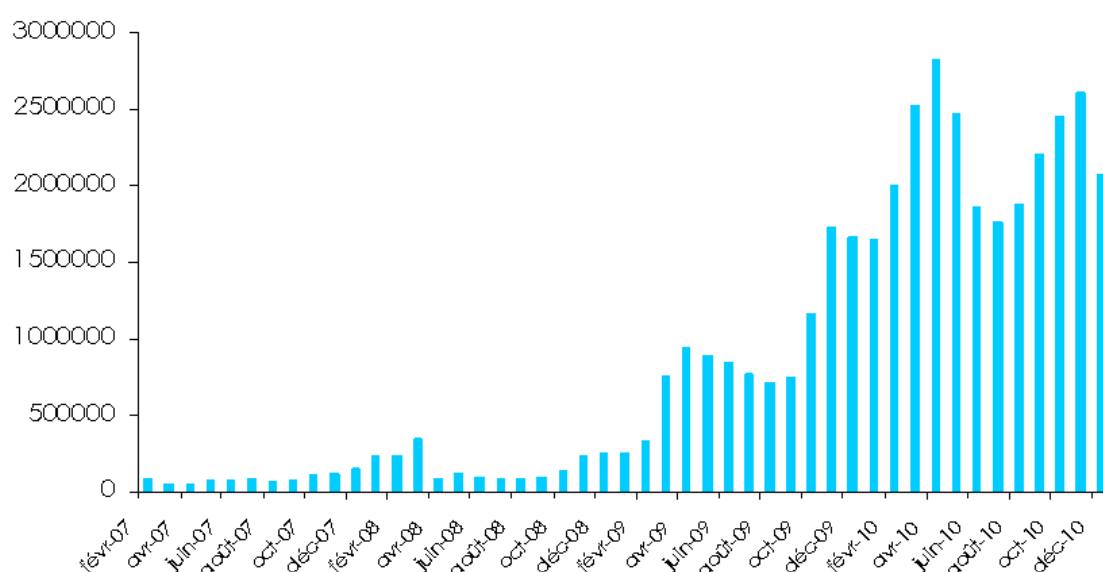
	2007	2008	2009	2010
Sales in Tonnes	78,1	149,6	701,2	1590
Sales in Mil KT	4.88	127	801	1785
Coups solda /Day	3414	6532	35319	86860

Source: Graeme DANONE (unpublished data)

GD has adjusted rural retail price of *Shakhty Dai* downward in the recent past yet GD management feels that the current rural retail price of Taka 7 is beyond the purchasing power of majority of the rural poor children, who are its primary target beneficiaries. So the company intends to try to reduce price further. On the other hand, GD is currently in the process of building another processing unit in Saver near Dhaka mainly to serve Dhaka and other urban markets though 60% or more of the Bora plant output is already sold in the urban areas. By 2020 the company looks forward to replicate the Bora model all over Bangladesh to be able to cover the needs of all the kids of the country. The company will welcome partners to invest in this social business and take responsibility of various clusters of these mini plants to extend healthy nutrition over the rest of the country.

It is claimed that the source of raw milk for the Proposed Saver plant will continue to be smallholder dairy producers but from which geographical areas remain unclear because of the already intense competition among processors to collect milk from the major milk sheds of Dhaka. Even if the Saver plant and other future plants are run with raw milk procured from smallholders, and even of ‘extending healthy nutrition over the rest of the country’ is a stated goal, making urban areas as principal target markets for selling output will mean that GD’s business will actually expand to take advantage of a large and expanding urban market for convenient and nutritious snack like *Shakhty Dai*, neglecting or undermining the original objectives of GD as a social business to serve mainly rural poor and malnourished children.

Figure 2.2 Sales evolution for *Shakhty Dai*: a bumpy learning curve



Source: Graeme DANONE (unpublished presentation)

2.5.2 CARE-DANONE Japan project

This project is being implemented with a three year grant from Danone Japan, which is a business entity but not a social business. The project is implemented in 50 primary schools in 5 upazilas in Bogra district to increase awareness and appreciation among teachers, school children and their families about hygienic health practices like using toilets, washing hands, brushing teeth, using soap for various daily purposes, and about the virtue of balanced and nutritious food, the nutritional value of various food items. The programme includes class lectures and discussions, feedback sessions, practicing school gardening to produce vegetables for earning income or for consumption at school, taking learned messages to parents and other family members for their awareness and practice. Many of these topics are already in normal school curriculum but deliberations are inadequate and theoretical due to lack of sufficient number of staff and other resources. The project therefore provides complementary resources including a part-time specialist instructor and teaching materials to

teach the project objectives through a number of lecture modules, and it is hoped that the school will eventually internalize these practices in their normal teaching programmed.

The CARE instructor holds one session per fortnight on the designated modules and on that day each attending student (and teacher) is given a cup of micronutrient fortified *Shakti Dai*, bought by the project from GD. Thus requires about 10,000 cups of *dai* per session. The project has made arrangements with private transport service providers to collect *Shakti Dai* packets from GD factory and deliver to designated project school on the designated day. Thus two cups of yoghurt is given free each month as an incentive to attend the sessions earmarked to achieve the project objectives. So about 1200 kgs of yoghurt is distributed every month to the school project. As such this is not exactly a school milk (yoghurt) programme and its impact pathway and indicators are difficult to chart. The project is in its first year of implementation and during field trip, the project staff and a participating school (probably atypical being at the upazila head quarters) claimed to have observed better school attendance and class performance even from this small amount of supplement. But such an association may be difficult to establish because the yoghurt cup is given only on project related session days when attendance obviously may be high.

2.5.3 Problems in the cold chain and a new product innovation

It appears that all the cold chains used for marketing *Shakti Dai* - RVS and Shakti Ladies, CARE's retailer ladies and delivery to the CARE project schools – pose problems for maintaining and assuring quality and safety. There are three types of risks.

First, The cool box on the RVS's van and the cool bag carried by the Shakti Ladies and CARE's women retailers assure safety and quality for 24 hours or upto 48 hours if ice bottles or ice packs are put inside, in which case fewer cups can be accommodated. If these sellers can't sell all products within this time limit, there is real possibility of product quality deterioration, so GD guarantees to take back unsold products, and actually does so, which entail losses. Even though return rate is still negligible because of the close proximity of the plant in Bogra district and intensive supervision, it may be high when larger geographical areas are to be covered.

Second, if any retailer sells degraded product without realizing its real quality, this may create health hazard and jeopardize the market potential of the product in general. Such an incident has not occurred yet because of close supervision and surveillance by GD as well as promotional education of the retailers about the risks of selling degraded products. All these lead to enhanced cost in terms of money and manpower.

Third, road conditions and transportation vehicles used in the rural areas are not always good. So during transportation, due to too much jerking, *dai* packets may be damaged. Selling such damaged cups is prohibited and they are taken back as unsold yet a retailer may not notice or detect such minor defects and inadvertently sell such products. The risk of selling minor torn *dai* cup by any retailer is low yet it can't be ruled out altogether. Even supervision and surveillance may not guarantee full protection against this risk.

GD is continuously evaluating its monitoring results and feedback to sharpen the safety measures to assure quality and safety, but realizes that marketing in rural areas will continue to be a serious challenge. While trying to improve the safety of the cold chains for *Shakti Dai*, it has been working on product innovation in order to produce a product with longer

shelf life. And recently they have come up with a product named or described as ‘fermented milk’, which is actually a micronutrient fortified mixture of cereals and milk packed in a small 40g pouch. This is neither a pasteurized product nor a UHT product but its self life under normal room temperature is 21 days. So no cold chain will be required for its marketing, and transportation will also expected to be less hazardous compared to that for *Shakti Dai*. It is claimed that the 40g pouch meets 30% of daily nutrient requirement of small children. If two of these are taken instead of one 60g *Shakti Dai* cup, 50-60% of daily requirement can be met.

Limited amount of the product is being currently produced for pilot testing its acceptability, shelf life in real retail market conditions and delivery mechanisms, and their advantages and disadvantages. There is no plan yet to replace *Shakti Dai* altogether with this product as both products are expected to have their own market niches. One of the distribution channels used for pilot testing is the twice a month distribution to the CARE-Danone Japan school project which will be supplied at the rate of two pouches per day due to lesser cost than one cup of *Shakti Dai*. Therefore, 40,000 40g pouches of fermented milk will be delivered per month in place of 20,000 60g cups of *Shakti Dai*. The primary advantage of this new product is that it will solve the problems of running a cold chain that is costly to run and supervise yet not fully secure to assure quality and safety of the product.

3 A Review of Dairy Development and School Milk Programme in Thailand

An understanding of the objectives, governance and contribution of the Thai school milk programme (SMP) requires a brief examination of the evolution of the dairy sector in the country because the structure of the sector prior to the introduction of the SMP in 1992 provided the context for introduction of the SMP while the situation after its introduction has been significantly shaped by the SMP.

3.1 Milk production and import growth, 1961-2008

Historically, smallholder crop-livestock mixed farming dominated Thai agriculture until very recently. Cattle and buffaloes in these systems were primarily used for draught power and meat (mostly after culling) as milk consumption beyond infancy was not common perhaps because of lactose intolerance among majority of the adult population and beef consumption was low due to its high income elasticity of demand and small share of urban population. In the 1940s and 1950s, Indian and Pakistani settlers in the suburban areas of Bangkok used to raise some dairy cattle because of their tradition of consuming milk and milk products like cheese, yoghurt and sweets (Chantalakhana quoted in FAO, 2002). In the 1950s, under a joint programme of the United Nations and the Thai Government, powder milk was distributed to health clinics and schools to enrich diet of vulnerable people as well as to make the Thai population familiar with milk. In 1956, a Dutch company started producing plain and flavoured liquid milk out of imported powder milk to serve upper class urban consumers. These rudimentary consumer markets perhaps provided the trigger for subsequent development in production, import and consumption of milk in the country.

From a modest level of production and import in 1961, the sector experienced phenomenal growth (Table 3.1). From 1975, annual production level approximately doubled every five years. Increased domestic production resulted from rapidly increasing number of milk cows as well as increase in productivity. Yield per cow per year increased from about 1000 kg in 1961 to about 3000 kg in 2001- an additional 500 kg yield per animal was achieved every 5 years since 1961. From 1970 onwards, production growth far surpassed import growth so share of domestic production in consumption increased. Per capita consumption increased from 2 litres/year in 1984 to 23 litres/year in 2002. Between 1996-2006, consumption per capita increased by over 6% annually. In 2006, share of domestic production in total consumption (in liquid milk terms) was 30% compared to 20% in 1996 (http://www.aphca.org/reference/dairy/chiangmai_workshop_feb08.html). Due to high consumption growth, during 1996-2008, import level exceeded agreed quota under WTO/TAFTA though the gap decreased in more recent years (Table 3.2). By 2010, per capita consumption increased to 28.6 litres/year and share of domestic production in total consumption increased to nearly 50%. And 80-100% of raw milk production has been converted into ready to drink milk. There are now 20, 000 dairy farmers raising over 250, 000 milk cows and the industry employs over 250, 000 people throughout the production-processing-marketing chains (Jarialertsakdi, 2010).

The nature of growth of the sector prior to the introduction of the SMP in 1992 has been influenced by interlinked efforts in the areas of breed development and promotion of dairy farming, organization of farmer cooperatives, promotion of dairy consumption and

investment in dairy processing. Since 1950, several steps were taken by different agencies for dairy development in the country. A brief discussion on these aspects follows.

Table 3.1 Milk production and import in Thailand, selected years

Year	No of milk Cows	Whole milk production (tons)	Import (tons)	
			Skimmed milk powder	Whole milk powder
1961	2000	2000	624	1535
1965	2000	2300	2036	2277
1970	2800	3500	22426	4428
1975	7200	14000	20767	6656
1980	15000	30000	25054	11247
1985	26431	57895	25840	18896
1990	44450	130278	47536	17336
1995	99456	307229	79919	41192
2000	201000	520115	53024	48249
2005	300000	888220	69671	33016
2008	262000	786186	60666	25402

Note : The import levels shown in this table differ from those shown in table 3.2. Most likely, figures in Table 3.2 refer to only whole milk powder.

Source: FAOStat.

Table 3.2 Quantity of milk quota and tax for imported milk powder, 1995-2008

Year	Based on WTO/ TAFTA Agreement (Tons)		Tax (%)			Actual imports (Tons)
	WTO	TAFTA	Within quota	Actual tax	Over quota	
1995	45,000	-	20	5	237.6	55,000
1996	46,111	-	20	5	235.2	88,000
1997	47,222	-	20	5	232.8	88,000
1998	48,333	-	20	5	230.4	88,000
1999	49,444	-	20	5	228	88,000
2000	50,556	-	20	5	225.6	55,600
2001	51,667	-	20	5	223.2	65,000
2002	52,578	-	20	5	220.8	73,000
2003	53,889	-	20	5	218.4	68,348
2004	55,000	-	20	5	216	67,252
2005	55,000	2,200	20	5	216	67,200
2006	55,000	2,200	20	5	216	64,700
2007	55,000	2,200	20	5	216	59,465
2008	55,000	2,200	20	5	216	65,431

Source: FAO RAP based on DLD and Bureau of Trade unpublished data

3.2 Breed and feed development³

Since indigenous cattle and buffaloes were basically not dairy breeds, in 1950, Kasetsart University in Bangkok, then under the Ministry of Agriculture and Cooperatives (MAC), initiated research on dairy cattle breeding at its experimental dairy farm with a herd of imported Swiss Brown cattle. The herd did not perform well in Thai conditions. In 1952, a herd of RedDen (Red Danish) cattle was imported for adaptation but that also did not perform well (FAO, 2002). In 1958, the Department of Livestock Development (DLD) under the MAC imported a herd of Holstein Frisian from Germany and maintained at a Thai-German experimental farm but this also did not perform at a level required for viable commercial dairy farming.

In 1962, following a visit by His Majesty the King of Thailand to Denmark, a Thai-Danish Dairy Farm was established at the Royal initiative at Muak Lek in Saraburi Province (to the north-east of Bangkok) for dairy research. When the cooperation programme finished in 1971, the Dairy Farming Promotion Organization (DFPO) was established and it took over the farm. The Thai-German farm was also handed over to DLD in 1977. Experimentation with RedDen and Frisian and their crosses by DLD and DFPO research centres continued at varying intensity until 1980 but performance at the station and in actual farm conditions turned out to be poor or unsatisfactory.

Given the above, in 1980, a herd of 50-50 Shahiwal:Frisian cross was imported from Pakistan to upgrade the Frisian blood content after adaptation. Research and adaptation of breed also involved development of appropriate feeds and rations, breeding services, disease control and management packages for optimal performance. This strategy appeared to be somewhat satisfactory as average daily milk yield under farm conditions increased from about 8-10 kg in the 1980s and 1990s to about 15 kg at present. The national dairy herd is presently composed of animals with about 87.9% Frisian blood.

Thus the unique feature of dairy development in Thailand is that it has been pursued not by trying to develop any breed based on indigenous genetic material or by upgrading any indigenous breed using exotic blood but by adapting imported crosses of exotic breeds. Further enhancement of productivity of the current national herd is the present research goal but feed still remains a major constraint for productivity improvement because crop residues and low quality roughage is a major share of the ration used by farmers, and the quality varies widely between farms and regions depending on the type of material available. Also land is scarce so allocation of land for fodder production is problematic for smallholders who are majority though for larger farms it is less problematic. This issue received priority attention in research and DLD has developed a hybrid high yielding Napier grass, which is being multiplied and disseminated at present. It is expected that successful dissemination of this fodder will help resolve major part of the feed constraint and improve productivity significantly.

³ Partly based on an interview with Theera Rukkwamsuk and Pipat Arunvipas, Associate Professors, Department of Large Animal and Wildlife Clinical Science, Kasetsart University, Kamphaengsaen Campus, 8 September 2011.

3.3 Promotion of dairy farming

Alongside experimental and on-farm adaptive research on breeds, feeds and management, efforts were made to promote adoption of dairy by farmers as a commercial enterprise. Systematic promotion of dairy was started in earnest after the 1962 royal initiative to establish the Thai-Danish Dairy Farm. A package around 5 cows and other technical and financial support services were developed for dissemination by the Farm as well as the DLD. Training, extension, veterinary and artificial insemination services were provided free. Soft loan was provided by the Bank of Agriculture and Agricultural Cooperatives for acquisition of animals, equipment, and for building animal house. After establishment of the DFPO in 1971, it has played an important role in introducing technology to farmers and organizing dairy cooperatives in the central region. In 1978, the DFPO undertook an ambitious 10 year plan to raise fresh milk production to a level required for attaining self-sufficiency, which, along with various supporting policies, accelerated growth though self-sufficiency has not been achieved yet as demand growth outstripped supply.

The central region received main attention for dairy promotion in the beginning because of the existence of Bangkok, the capital, as the market for milk. Central region was the richest among the four regions because of backward and forward linkages with economic activities in Bangkok region. For example, in 1994, average farm size was respectively 4.33, 3.82, 3.72 and 5.26 ha in the northeast, north, south and central regions. But GDP per capita for these regions was respectively Bt 20235, 31064, 39789 and 69589. In Bangkok region it was Bt186167. However, dairy was perceived as having a potential for increasing farm income, reducing poverty and decreasing regional disparity in income. So dairy was promoted in all the regions in varying intensity by providing various forms of incentives and support services. In some regions farmers used to produce cassava, sugarcane or corn, which were not very remunerative due to low yield and low local and world market prices which threatened their livelihood. So DLD and DFPO's promotional messages on dairy attracted them as an alternative livelihood strategy. Local leaders and innovators provided additional impetus for adoption of dairy as a new enterprise. Of the 74 provinces in Thailand, only two had no dairy farms in 1993. Although central region had the highest concentration of dairy animals, growth rate overall was strongest in the north-east region where animal numbers in 1995 was about 14 times more than in 1986 while national average increase was 4.5 times (Table 3.3). Such widespread diffusion of dairy farming is a feature uncommon in many developing countries where dairy development has been largely promoted in high potential pockets with limited success. Not only dairy expanded geographically, herd size also increased rapidly. In the 1980s few dairy herds had over 50 head of cattle, by 1994-95, in the central and south regions, respectively 25% and 34% of the herds were of this size category (Table 3.4).

3.4 Promotion of dairy cooperatives

Profitability and viability of farms depended on remunerative market access. Urban areas, especially Bangkok, were the main consumption centres. In the absence of tradition of milk consumption in the rural areas, there was little local market for the producers. It was necessary to link farmers with dairy processors who served urban markets with pasteurized and UHT milk. This linkage was not feasible for individual producers because of their small individual volume of output and their dispersed location. Both these factors entailed high transaction costs for farmers to market milk and milk processors for collection. Therefore, farmers were encouraged by the Cooperative Promotion Department of DLD to form dairy

cooperatives and establish milk collection and chilling centres from where processors could collect milk for processing.

Table 3.3 Distribution of dairy cattle population by region, 1986-1995

Year	Region				
	Central	North east	North	Southern	All regions
1986	51 708	5 705	4 686	1 506	63 605
1987	55 598	4 163	5 829	2 086	67 676
1988	68 908	14 881	8 563	2 575	94 927
1989	103 041	16 463	10 346	2 926	132 776
1990	118 052	25 234	11 022	3 229	157 537
1991	151 067	25 539	10 618	3 970	191 194
1992	168 213	38 355	11 879	4 052	222 499
1993	166 688	46 121	19 609	4 771	237 189
1994	164 199	47 355	14 861	5 203	231 618
1995	185 370	79 678	16 706	5 493	287 247
Ratio 1995/1986	3.58	13.97	3.57	3.65	4.52

Source : FAO, 2002

Table 3.4 Percentage of total dairy cattle numbers by herd size and region, 1994-95 average

Herd size	Central	Northeast	North	South	All regions
1 - 2	6.7	4.9	0.6	4.8	3.1
3 - 4	11.5	9.7	2.0	11.1	6.1
5 - 9	20.8	19.4	12.4	21.6	16.1
10 - 19	19.1	22.7	34.8	16.6	27.9
20 - 49	16.2	21.7	34.7	11.8	26.7
50 - 99	5.1	10.2	7.8	6.7	7.3
100 - 499	5.2	11.4	5.4	16.4	6.6
500 and over	15.4	0.01	2.4	11.1	6.2
Total	100.0	100.0	100.0	100.0	100.0

Source: FAO, 2002

Legally, establishment of a cooperative society required a minimum of 60 farming families, with at least 300 cows between them. Farmers had to have passed a training course on dairy farming and have a minimum of 10 rai of land and preferably a minimum of 5 cows. The distance from the milk collection point should be no more than 20 km and there should be an approved market or buyer for the milk. Importantly, the intending cooperative should have access to veterinary and artificial insemination facilities or have these on their own. However,

in reality, initially some non-dairy farmers were taken as members by some societies to raise capital and some members having less than 5 cows were also accepted as members. Number of cooperatives increased from 27 in 1988 to 58 in 1993. Average membership of a cooperative was 254 during this period : 274 during 1988-90 and 234 during 1991-93 indicating that the average size of a cooperative became smaller over time. Total number of members increased from 7616 to 13358 between the two years, annual average membership was 11080.

Initially, the cooperatives often lacked the financial resources to invest in milk collection facilities and in transport and processing facilities. There were limited number of people in the dairy cooperatives with an adequate knowledge of management, accounting and extension. Even in the early 1990s, for many cooperatives, the scarcity of trained personnel resulted in them being run by government officers. Cooperative members had little, if any, say in the operation of the cooperatives (Thirasuttakorn quoted in FAO, 2002). So in order to help cooperatives run their own organization effectively, government assistance to cooperative societies included the following :

- Grants to cooperatives for investment in cattle and equipment;
- The provision of loans to farmers for purchase of animals and animal feed.
- Training of farmers through extension programmes in dairy cattle management and dairy cattle health;
- Training and education of members in organizational and financial management.

On the other hand, the cooperatives were involved in the following activities:

- The operation of milk collection centres where the farmers could deliver milk. This milk was purchased at a base price adjusted for butterfat content, protein content, bacterial count, sediment, water content and farm hygiene.⁴
- The processing of milk if there was own processing plant or the sale of the milk to other processors.
- Operating feed mills, if established, to produce feed concentrate and feed rations for members.
- The bulk purchase of equipment used by member dairy farmers on their farms.
- Providing extension services to farmers to improve farm management.
- Facilitating loans from the Bank for Agriculture and Agricultural Cooperatives.
- Running seminars to improve management practices.

Since the early 1980s, the Thai government pursued a policy of promotion of decentralization of investment for development and to that end the country was divided into several investment zones, and various forms of incentives like reduced duties, tax breaks, credit on easy terms were provided to encourage investment in zones away from Bangkok. Agriculture in general and dairy processors and dairy cooperatives in particular took advantage of these facilities to increase herd size, establish chilling and processing facilities and feed mills. By 1990, 12 private dairy processing companies invested 631 million Bhat of which 48% was Thai capital, the rest was foreign. Companies under exclusive Thai ownership invested 27% of the value, joint ventures invested 57% of the value and exclusive foreign subsidiaries invested 16% of the capital. Similarly, large investment was made in

⁴ After the 'melamine in milk' scandal in China, protein content has been dropped as a criteria for assessing quality in Thailand because of the possibility of melamine use to enhance protein content (Interview with Baan Bueng Dairy Cooperative, 10 September, 2010)

dairy feed mills along with feeds for poultry and pig industries. Some cooperatives also established their own processing plants and feed mills taking advantage of the incentive policies (Table 3.5). At present there are 117 dairy cooperatives of which 60 have processing facilities. In addition, there are 5 processing plants owned by the DFPO and about 30 private processors of varying sizes of which Nestle, Foremost, Melji and Dutch Milk are the largest.

3.5 Milk market and price prior to introduction of the school milk programme

Initially dairy producers had very limited local market for raw milk, so they formed cooperatives to facilitate bulk selling to private processors who serve urban markets. One or more processors usually signed a contract or MOU with a cooperative for purchase of milk at an agreed price. The farm gate price of milk was determined by the DFPO and DLD on the basis of estimated cost of production and a margin to match the open market retail price of pasteurized milk. Cooperatives usually received payments twice or thrice a month as agreed and members in turn received at the same frequency. Processors were also subjected to import quota as mentioned earlier. Thus subsidies and organizational support in the production sector and protection in the market provided an environment for rapid growth in output in the 1980s. However, retail price was determined by processors based on world market price as well as local market conditions without government interference. So, when world price for powder milk fell and/or milk exporting countries pursued subsidized exporting policy, domestic dairy producers and cooperatives faced problems in selling milk because large processors found import more economic than buying milk from dispersed domestic market. Transaction contracts were often ignored and enforcement of those contracts became difficult. In 1984, dairy farmers and cooperatives agitated over unsold milk and demanded assured market for milk to continue dairy farming, which led to the adoption of a number of measures including introduction of school milk programme for promotion of consumption and market expansion.

3.6 School milk programme as a new market outlet

3.6.1 Background and evolution

Partly in response to the farmers' complaint about unsold milk, The National Milk Drinking Campaign Board was established in 1985 in order to publicize milk as a nutritious food and promote its consumption. This organization and the National Youth Bureau conducted a campaign with private sector funding to publicize the dietary value of milk under a slogan : "Have you had your milk today?" (Itsaranuwat and Robinson 2003). The campaign also initiated a pilot programme in 1985 in selected areas of Bangkok and Chiangmai in which the parents of primary school and kindergarten children purchased milk at 25 percent less than the normal price through monthly coupons in order to create a taste for milk among small children and prepare them as potential future consumers of milk.

Malnutrition (especially protein-energy malnutrition) among pregnant and lactating women and preschool and school-age children continued to be a principal nutritional problem in Thailand even though the nation has enjoyed rapid economic growth in the past several decades. It recorded an average annual Gross National Product (GNP) growth rate of 6.7 percent from 1968 to 1986 (Warr, 2007). Previously malnutrition was regarded as a health

Table 3.5 The status of three dairy cooperatives

	Wangnamayen Dairy Cooperative Ltd Sa Keow Province	Nakhon Pathom Dairy Cooperative, Nakhon Pathom Province	Baan Bueng Dairy Coopearive Chonburi Province
Year established	1987	1974	1985
Membership at inception	200	10	25
Membership at present	1300	281	158
% members dairy farmers			
- inception	100	100	60
- Present	100	28	40
Number of cows at inception	1000	Few	150
Number of cows at present	42000	5000	3200
Raw milk production per day - tons	150	22	8
Collection centres	5	na	na
Year processing factory established	1998-2000	1985	1992
Processing - pasteurized milk	70 t/day	20t/day	10t/day
-UHT milk	60-70 t/day	None	None
% Sales to school programme	80	95	95
Other enterprises established	Feed mill, rice mill, coffee shop, minimart, gas station	Gas station, mini mart, coffee shop	200 cow dairy farm
Enterprises in pipeline/under Construction	Powder milk factory, drinking water factory, 1000 head dairy farm	None	None

Notes:

- All the cooperatives had started with few members, sometimes as an informal group, e.g. Baan Bueng Dairy Cooperative started as an informal dairy group in 1985 with 25 members and 150 cows primarily to pool milk for selling to a processor. Membership kept growing so in 1988, it registered as a cooperative with 122 members having about 3000 cows. Initially all of them received grants from one or more sources e.g. the central and provincial governments, cooperatives and in some cases, external donor.
- Growth of membership and size of business of a coop depended on success of the initial effort, adoption of dairy by farmers in the area as well as leadership and management. Leadership quality made a lot of difference, e.g. strong leadership of the Wangnamayen Dairy has transformed it into a large multi-enterprise business group in a relatively backward area and it has plans to expand further.
- Members are generally promise bound to sell milk to its collection/processing unit at prices determined by the government or by themselves. They also have obligations to supply school milk – either pasteurized or both pasteurized and UHT. But recently some cooperatives are facing the problem of default from members, e.g. some members even directors of Baan Bueng Coop sell a significant portion of their milk to outside buyers at higher prices rather than selling to its own processing plant, so the coop has to buy milk from outside to fulfill school milk obligation. The result is less profit and bonus for members for now but such behaviour of membership may eventually make the coop suffer losses and eventual collapse.
- All the cooperatives have various packages to serve members, e.g. credit, AI and vet services, feeds for cash or credit etc, to improve production. Recently they have been facing the problem of membership drop out because older generation is retiring and younger ones after having higher education are less interested in dairy or agriculture. So some cooperatives have both dairy and non-dairy farmers and others have only dairy farmers as members. Average dairy herd size is increasing in varying degrees which may compensate loss of member.

Source: Field visit and interviews

problem and was addressed under the health programme but since 1982, the problem was linked with poverty alleviation and community development programmers. Experiences of two previous pilot school lunch programmes (SLP) provided a basis for approaching the nutrition problems of children through school lunch programme. One was initiated by the Bangkok Metropolitan Administration in 1977 targeting the city's lower income households with funding from the government as well as the private sector and some individuals. Another initiative was taken in 1987 by the then National Primary Education Authority under the Ministry of Education, which directed every school to implement a free school lunch programme for all students and some financial assistance was provided to schools in deprived rural communities where agricultural production was low or not feasible and students were unable to afford to buy lunch (Kachondham et al. 1992). Although insufficient funding impeded full coverage of all schools and all students, these initiatives promoted public recognition of the importance of school feeding which eventually led to the adoption of The Fund for School Lunch of Primary School Act B.E. 2535 in 1992, under which central government fund was allocated to all primary schools to provide lunch to all KG-Grade 6 students suffering from malnutrition and to a lesser extent, to students living in poverty in remote rural areas. The objectives were to enhance food security, promote desirable/healthy eating habits and promote full growth and development of children. The mode of implementation of the programme (food menu, procurement and delivery, supervision and management) and student coverage varied widely across schools and regions and between rural and urban areas.

The pilot school lunch programme implemented since 1987 suffered from some deficiencies e.g. the food menus provided were often small and low quality in terms of nutritive value, which highlighted the need for improving the size and quality of the lunch menu. About the same time, FAO drew attention of the Thai government to experiences with school milk programmes implemented since the second world war in Europe and the USA and more recently in many developing countries, as a vehicle to provide nutritious food to children suffering from malnutrition. The message was that milk contained protein, fat and over 12 essential micronutrients required for healthy growth of children. If these are missed in infancy and early childhood, the resulting deficiency in physical and mental growth can't be recovered or compensated fully even with better nutrition in later years. So in 1992, in addition to the school lunch act, School Dietary Supplement (Milk) Project was introduced to solve the problems of child malnutrition as well as to create market for Thai dairy farmers. In 1992, 1993 and 1994, central government funding was allocated to provide 200 ml milk to kindergarten students throughout the country for 120 days. Subsequently all grades in primary schools were gradually covered and duration of milk supply was also increased to 200, then 230 then 260 days (Table 3.6).

After the introduction of the school milk programmer in 1992, both producer price and factory gate (processor) price for delivery of school milk were determined by DFPO and DLD, so a delicate balance had to be maintained to give both producers and processors adequate incentive to make the system work. Given the fact that the entire budget for school milk came from the government, budgetary implication also became a factor in the determination of prices at different points because over time the school milk programme became larger due to addition of grades and increased enrollment of students. In the early stage of the school milk programme, farm gate price was 38-40% of the factory gate price of school milk, but this ratio gradually increased to over 50% in recent years (Table 3.7). The producer share of retail price of milk in the open market has been much less as the open market price was unregulated and higher than factory gate price for school milk. The

implication of increased producer share of the factory gate price depended on who supplied school milk. Initially school milk was mainly supplied by private dairy processors, so they benefitted from a smaller producer share of retail price of processed milk. Over time, taking advantage of various policy support, as explained earlier, a large number of cooperatives also created processing facilities and they became suppliers of school milk. A significant proportion of cooperatives sell over 80% of their raw milk output to the school milk programme, so members receive income from selling raw milk and bonus on shares in the processing enterprise and other businesses as discussed earlier. An increased producer share of retail price or school milk price, therefore may mean lower bonus income from processing enterprises. However, most cooperatives have been reportedly paying good rates of bonus on members' shares, which indicates that both farm and factory gate prices have been reasonably in favour of the cooperatives as producers and processors.

Table 3.6 Budget, coverage and number of students involved in the school lunch and school milk programmes, 1992-2010

Year	Budget (mill Bhat)		Coverage (grades)		N of students (Mill head)		N of days provided	
	SLP	SMP	SLP	SMP	SLP	SMP	SLP	SMP
1992	30	279	K-P6	K	na	0.69	na	120
1993	220	424	K-P6	K	na	1.26	na	120
1994	1333	1208	K-P6	K	na	1.62	na	200
1995	2147	1715	K-P6	K-P1	na	2.8	na	200
1996	2286	2213	K-P6	K-P2	na	3.52	na	200
1997	2412	4335	K-P6	K-P3	na	5.01	na	200
1998	2525	5324	K-P6	K-P4	na	5.39	na	200
1999	2966	5356	K-P6	K-P4	na	5.84	na	200
2000	3213	5981	K-P6	K-P4	na	5.9	na	200
2001	3272	6070	K-P6	K-P4	na	6.22 ^a	na	200
2002	3079	6752	K-P6	K-P4	na	5.84	na	230
2003	2556	6819	K-P6	K-P4	na	5.96	na	230
2004	3394	6853	K-P6	K-P4	na	5.99	na	230
2005	5005	7000	K-P6	K-P4	na	6.09	na	230
2006	5279	6989	K-P6	K-P4	na	6.07	na	230
2007	5144	6570	K-P6	K-P4	na	5.37	na	230
2008	na	6520	K-P6	K-P4	na	5.33	na	230
2009	na	10010	K-P6	K-P6	na	7.11	na	260
2010	na	14000		K-P6	na	8.4	na	260

a. K means kindergarten. In 2001, students of grades 5 and 6 with malnutrition problems were included, hence this enhanced number of students served.

Source: Department of Livestock Development (DLD), unpublished data; Kanemasu, 2007

3.6.2 Governance of the programme

Although the programme significantly contributed to increased production and consumption of milk in the early stages, its governance raised new issues, which were resolved through policy changes. From inception in 1992 until 2000, the Office of the National Primary

Education (ONPE) purchased the milk for the schools it supervised. The purchase was on a competitive bidding basis. Potential bidders could bid for supplying one or more schools depending on their capacity and interest as some did not want to sell entire output to school

Table 3.7 Farm gate, factory gate for delivery to school and retail prices of milk, 1986-2011

Year	Farm gate price, Bt/kg raw milk*	Retail price, UHT milk Bt/kg**	School milk price, Bt per/lit pasteurized milk (c)	School milk price, Bt per/lit UHT milk (d)	Farm gate price as share of retail UHT price (e) = a/b	Farm gate price as share of pasteurized school milk price (f) = a/c
	(a)	(b)	(c)	(d)	(e) = a/b	(f) = a/c
1986	6.55					
1987	6.59					
1988	6.62					
1989	6.65					
1990	7.01					
1991	7.12					
1992	7.51		20.00			0.38
1993	7.98		20.00			0.40
1994	7.96		20.00			0.40
1995	7.96		20.00			0.40
1996	9.07		20.00			0.45
1997	9.39		20.00			0.47
1998	10.66		22.20			0.48
1999	11.25		22.20			0.51
2000	11.17		22.20			0.50
2001	11.33		22.20			0.51
2002	11.34	31.69	22.20		0.36	0.51
2003	11.35	32.28	22.20		0.35	0.51
2004	11.38	32.16	22.20		0.35	0.51
2005	11.48	32.35	22.20		0.35	0.52
2006	11.50	32.86	22.20	23.45	0.35	0.52
2007	12.91	34.01	23.45	29.70	0.38	0.55
2008	14.56	36.10	25.70	32.60	0.40	0.57
2009	16.50	41.73	31.30	39.30	0.40	0.53
2010	17.00	42.10	31.30	37.75	0.40	0.54
2011	18.00	43.20	31.85	38.05	0.42	0.57

Note: Retail price of pasteurized milk could not be collected, so only retail UHT price is shown. Usually price of UHT milk is higher than that for pasteurized milk. National school milk programme started in 1992, so prices are shown since then. UHT milk distribution in school milk started much later. School milk is served in 200 ml packets and priced as such but price is shown per litre for easy comparison with farm gate price

Source: *Office of Agricultural Economics, Ministry of Agriculture and Cooperatives
 **Bureau of Trade and Economic Indices, Ministry of Commerce

programme. The lowest bidder usually would be awarded the contract but sometimes the distance between the supplier's processing facility and the school could be prohibitive for timely and efficient delivery. During this period, only condition about the form of the product was that 200 ml packets of pasteurized milk should be supplied. There was no restriction or specification on the source of raw material to be used so raw milk or powder milk or a mixture could be used as raw material. Also there was no restriction or specification on the type of packing and labeling to be used so pouch or sachets or paper cartoons could be used for packing, and any kind of labeling the company or cooperative preferred could be used. Therefore, school milk could not be separated from commercial milk which might require a different quality standard. As the coverage of the programme increased, demand for milk increased rapidly, and since lowest bidder was awarded the supply contract, various kinds of quality problems arose as suppliers tended to use more powder milk of questionable quality when world prices were low, and adulteration with water to increase volume was also rampant. Together these problems led to deterioration of the quality of milk in some cases.

In order to address these problems, several policy measures were taken. In 2000, it was proclaimed that only raw milk could be used to prepare packets to supply school milk, the objective being elimination of dilution with powder milk. In 2001, a common design for school milk packets was provided which every supplier of school milk had to follow. As a result, school milk was given a separate identity or brandlike presentation different from commercial milk even though the labeling included the name and logo of the supplier. A system of zoning at the provincial level was introduced so that only specific suppliers satisfying specified criteria could supply a particular zone. This arrangement would also ensure supply of local milk to local schools and create a sense of ownership of the programme among all stakeholders involved. However, later the province level zoning was found to be very restrictive, so it was redefined at the regional level, which means that processors in a given region could participate in a bidding process to supply milk to one or more schools in the region depending on processing capacity of the processor. As a result some processors might be left out of the school milk programme if they failed to win any bid. In 2003, there was a proposal to define zone by fixing the distance between school and processing plant at a maximum of 100 km but this was not implemented due to the small number of dairy processors in the country and their concentration in a few locations.

In 1999 the central government adopted a policy of decentralization of civil administration by giving more authorities to Local Administrative Organizations (LAO). So the administration and governance of schools became the responsibility of LAOs, and rather than sending central government funds directly to schools from the Education Ministry, the fund was channeled through the Interior Ministry to the LOAs for further distribution to individual schools. Since 2001, in line with the general school fund allocation, central government fund for school milk has been sent to the LOAs. However, the regional zoning for supply of milk to schools by processors had to be synchronized with the LOA boundaries. More than one LOA might fall within the boundary of a zone. So based on decisions of the National School Milk Committee and directives of the Dairy Farming Promotion Organization (which serves as the secretariat of the committee), a tri-partite agreement used to be signed between the LOA, the schools within the LOA and the milk processors that are allocated quota to supply milk to schools within the LOA. Under the agreement, the processor was obliged to supply agreed and required quantity of milk directly to the school but would receive payment twice or thrice a month from the LAO on the basis of certified invoice submitted by the school. The LOA in turn would receive reimbursement from the Interior Ministry every quarter or on a

half yearly basis. This means that the LOA had to use its own cash to pay the processors more frequently than it received reimbursement from the central government.

Initially milk was supplied only on school days but later school holidays were also included in the programme. Pasteurized milk was the product supplied for daily instant consumption at the school, but inclusion of holidays in the programme created problems for the schools as either students had to come to school during holidays to drink milk if supplier delivery was daily as before, or if supplier delivery was periodic, students could take periodic delivery of packets, if they had refrigerator at home, to consume at home. But it could not be ascertained if they consumed themselves at the prescribed time and manner or shared with other members of the family. After a while the problem created by pasteurized form was solved by procuring UHT packets for the holiday periods (the MOUs for purchase specified the delivery schedules for pasteurized and UHT milk packets)⁵ and by making periodic delivery to students to take home as no refrigeration was required. However, the other problem of ascertaining regular and timely consumption by the students themselves instead of sharing within the family remained unresolved. Perhaps this need not be emphasized in the Thai context today as the primary objective is to promote milk consumption among children and no nutritional impact data (e.g. height and weight) are recorded during the holidays.

In spite of the above measures, marketing problems of producers did not disappear altogether. Farmers sometimes faced the problem of unsold milk as some processors, contrary to rules, mixed some powder milk with raw milk whenever it was economic. This was prompted by two factors. First, raw milk had to be purchased at prices fixed by the Ministry of Agriculture and Cooperatives and the price was high in relation to the world market price. On the other hand competitive bidding to get school milk supply quota required that the offer had to be at lower prices. There was thus the possibility of a mismatch between these two market prices. Moreover, due to lack of local demand and competition among suppliers, retail price of commercial pasteurized milk market was also very low in many areas, so processors might incur losses in the commercial milk market sector. This situation made room for adulteration with powder milk or water to reduce cost in order to compete at lower price to supply school milk, which then might be of lower or poorer quality.

In order to address such problems, in 2005 the government intervened by making a rule that in order get a right to supply milk to school, a processor had to buy a portion of raw milk from domestic producers to get import permit for another portion, and that a processor could supply to the school programme only up to the amount of raw milk it purchased. However, the problems created by mis-matched prices at producer, retail consumer market and school levels continued to disrupt smooth running of the dairy sector in general and management of the school milk programme in particular. For example, there was unsold milk (in 2009, out of 2559 tons of milk produced per day, MOUs were signed with producer cooperatives for 1088 tons to supply school milk and for 1354 tons for commercial marketing, leaving 107 tons unsold) and there was occasional news about corruption in milk auction in some places, which was also a manifestation of the underlying problem. In order to address these problems, the governance mechanism of the school milk programme was changed a couple of times between 2005 and 2009, e.g. the zoning system for allocation of milk to schools was rescinded and reintroduced with some modification; the roles of the Ministry of Agriculture and Cooperatives, the DFPO, the DLD, the School Dietary Supplement (Milk) Sub-

⁵ If a supplier processor does not have its own UHT processing capacity to fulfill the holiday delivery requirements, it usually gets into contract with a bigger processor having UHT facility and gets its raw milk processed into UHT form or sells its raw milk to the processor and buys UHT milk from that processor.

Committee, the Dairy Cow and Product Committee were defined and redefined. At the end, between 15 December 2009 and 16 February 2010, several deliberations by the Cabinet and other relevant bodies and committees led to the adoption of a series of decisions to address the problems of the sector in a comprehensive manner. Some key elements of those decisions are as follows:

a) The system should ensure that dairy farmers can sell all their milk at reasonable/remunerative price, school children can get quality milk processed in the country without adulteration with powder milk or other substance; producers can sell and processors can purchase, process and sell milk at minimum logistics and transactions costs; flow of funds is adequate and timely so that all payments between parties are made in a timely manner.

b) The School Dietary Supplement (Milk) Sub-Committee will act as the Central Committee for management of the School Milk Programme and the DFPO will act as the Secretariat of the Committee. The DFPO is authorized to sign MOU with all processors who will sell school milk to the LOAs and distributors. Thus the DFPO has two roles. It is a regulator and monitor assessing the amount of raw milk available, the amount of milk to be distributed to schools, designate areas where processors will distribute milk, and monitor and certify the quality of raw milk and processed milk. And it is also a supplier of milk from its processing units to the school milk programme.

c) Based on the accumulated experiences in running the programme since 1992, the School Dietary Management (Milk) Sub-Committee developed a set of mandatory criteria and guidelines for various stakeholders involved in the system for proper running of the programme. The criteria and guidelines include the following (details are in Appendix B):

- Criteria for selecting entrepreneurs to join the project
- Criteria for granting rights and designating school milk distribution areas to entrepreneurs in the project
- Guidelines for purchase of school milk by LOAs and private schools
- Guidelines on school milk transportation and storage
- Measures to monitor and control the distribution of school milk in school milk dietary supplement (milk) project
- Guidelines on prices for pasteurized and UHT milk

d) The entire programme will be financed by the central government and several ministries will have specific roles. The Ministry of Interior will be the buyer for government schools administered through LOAs, Ministry of Education will be the buyer for private schools; the Ministry of Agriculture and Cooperatives will administer quota allocation for raw milk sales; the Ministry of Public Health will be responsible for product approval and quality control, and the Ministry of Industry will be responsible for issuance of production license for processors.

3.6.3 Outcome of the programme

The contribution of the school milk programme to the growth of the dairy sector can't be measured precisely based on any single criteria. However several indicators may be presented to highlight its contribution to the dairy sector.

The main pathway of impact of the school milk programme on the dairy sector has been through enhancing consumption and reducing malnutrition among children. Due to the school milk programme, per capita consumption of milk increased rapidly. For example, currently, school milk consumption constitutes 37% of domestic raw milk production, and 16% of overall national consumption (Table 3.8). Overall per capita consumption is about 29 l/capita/year but school students alone consume about 52 l/capita in 260 days, thus overall increase in per capita consumption has resulted from school milk programme but school leavers perhaps continued their milk drinking habit, as originally envisaged in launching the programme, hence overall average consumption also increased rapidly.

Table 3.8 Some impact indicators of the school milk programme, 1992 and 2009

	Base year	Base year value	2009 value
Number of dairy cows	1992	43940	280,000
Raw milk production, t/year	1992	134,011	840,691
Milk used for school milk prog, t/year	1992	16,560	312,000
Overall liquid milk market, t/year	1992	552500	1,900,000
School milk as % of raw milk production	1992	12	37
School milk as % of milk consumption	1992	3	16
Domestic raw milk as % of overall consumption	1992	24	44
Milk consumption per capita, l/year	1992	na	29
Milk consumption per capita by school student, l/year	1992	24	52
Number students served by school milk, million	1992	0.69	7.1
Annual budget million Bhat	1992	278.6	10010
Number of dairy cooperatives	1996	62	117
Number of dairy cooperative members	1996	15525	20000
Number of dairy processors -Total	1992	70	91
of which cooperatives		na	61
Number of processors selling milk to schools -Total	2003	69	68
of which cooperatives		na	na
Number of processors making pasteurized milk	2003	69	72
Number of processors making UHT milk	2003	11	11

Source: FAOstat ; Department of Livestock Development; other unpublished sources

In the beginning some systematic records were kept in the schools on height and weight of children under the school milk programme as well as on their school attendance. A study by Mahidol University conducted in 1995 acknowledged the importance of school milk as a supplementary drink in meeting the nutritional requirements of school feeding but no precise impact parameters were reported (Chittchang 2005). No systematic analysis of the school records have been done to assess the nutritional and other impacts of the programme.

However, nationally child malnutrition dropped to less than 5% in 2006 from 18% in 1992, the year of inception of the school milk programme (Chittchang 2005; Kanemasu, 2007; Jarialerttsakdi, 2010). Jarialerttsakdi (2010) also reported that in 2004 children height grew 5 cm a year compared to 2-3 cm in 1992. It can be reasonably argued that school milk consumption has contributed a significant share of these changes along with general economic growth, school lunch programme and other interventions occurring simultaneously in the economy.

Increased consumption and demand, even if artificially created in the beginning as a public sector demand, induced changes in different fronts. An expanding market induced existing producers to increase herd size and volume of production and new producers to enter the sector. Between 1990 and 2000, number of dairy cows doubled and milk production more than doubled every five years (Table 3.1). Currently share of domestic raw milk constitute 44% of overall milk consumption in the country (Table 3.8).

Major expansion took place in the producer cooperative sector. Number of societies increased from 62 in 1996 to 117 in 2009 and average membership of cooperatives increased from about 15000 to about 20000 between the two years (Table 3.8). Seventy two percent of the members were dairy farmers and they owned 82% of the total number of dairy animals in the country.

The size and capacity of the processing industry also increased rapidly. Number of dairy processors increased from 70 in 1992 to 91 in 2009. Number of private processors increased to 30 by 2010 though Nestle, Foremost, Dutch Milk and Melji control perhaps over three quarters of the private sector market. During 1995-2000, cooperative processing plants processed 78% of national milk output, the rest was processed by private processors who also processed imported powder milk. Since then many more cooperative societies established their own processing plants rather than just selling chilled milk to private processors. Sixty eight out of 117 cooperative societies now have processing units, others sell chilled milk to private and cooperative processors (Table 3.7).

Thus, school milk and cooperatives played a major role in the growth of the dairy sector because in the absence of the guaranteed market provided by the school milk programme and group efforts to create collection centres and processing facilities to compete with private processors, who otherwise could control the raw milk and retail markets, there would have been serious market constraints for the growth of the dairy farming sector.

4 Implications of Policies and Implementation Modalities of School Milk Programmes in Thailand and Bangladesh

In Thailand, smallholder agriculture did not have a strong dairy component because of the absence of a milk drinking tradition among the population. So dairy development required developing new dairy breeds of cattle and all the other supporting infrastructure. This has been achieved in a remarkable manner under Royal patronage and strong public sector policy support in the form of (a) identification and development of suitable breed and feeding systems, (b) promotion of dairy farming among producers through extension and training, (c) promotion of dairy cooperatives as well as private dairy processing for facilitating marketing and processing by providing support in the form of low interest credit, tax relief, exemption of import duties, organizational and management training, (d) adoption of milk price policies including tax and tariff policies to protect the domestic dairy sector as well as keep import open for private dairy processors to meet consumer demand at reasonable cost, and (e) school milk programme as a vehicle to provide a regular guaranteed market outlet for a significant portion of domestic milk output at an incentive price as well as address the problem of malnutrition among children and prepare them as future consumers of milk.

The issues surrounding domestic dairy production, marketing, import and urban consumer market are obviously highly interlinked and they have been handled in an integrated manner. The school milk programme was introduced at a critical juncture of the evolution of the dairy industry in Thailand when due to other supporting measures, production growth was high but market for domestic raw milk was limited, import was cheap due to global dairy surplus and subsidized sales by developed countries, so sustaining dairy growth became a challenge. The school milk programme not only provided a stable guaranteed market outlet for a significant portion of the output, with full public sector policy and budgetary support, it became an anchor for the dairy sector. The market share of school milk increased over time and about 50% of domestic production is now marketed through this channel. Implementation of the school milk programme was not an easy task. The system of governance of the programme evolved over time based on experiences gathered as well as knowledge derived from similar programmes implemented in other countries. The key lesson from the evolving governance mechanism in Thailand is that it has been developed with the participation of all stakeholders – the dairy producers and dairy cooperatives, private dairy processors, public sector organization like the Department of Livestock Development, Dairy Farming Promotion Organization, the research organizations, local civil administration and central government ministries of education and interior, and above all the country's cabinet, the highest policy making body.

In 1992, the year of inception, the school milk programme cost was about Bhat 279 million or about US\$12.5 million. In 2009, the cost increased to Bhat 14000 million or US\$467 million due to increase in student numbers, number of grades and number of days covered by the programme and change in cost per student per day. Government budget allocation per student per day has been changed only thrice since 1992. It was 5 Bhat (US\$0.17) in 1992, 6 Bhat (US\$0.20) in 1999 and 10 Bhat (US\$0.17) since 2004. Cost per student per year was US\$25, 37 and 39 in 1992, 1999 and 2004 respectively (Kanemasu, 2007; Anon., 2010). The yearly increase in cost per student is primarily due to increased number of days covered by the programme. Sometimes it is stated that Thai dairy developed due to highly subsidized public investment support, which is true. But considering overall public sector expenditure, the school milk programme cost has been so negligible yet it has generated so many times more benefits throughout the economy in many ways that there are possibly few other public

sector investment options which have produced similar outcomes. It should be noted that the school milk programme is a supplement to a regular school lunch programme for which the per student per day cost is slightly less than that for the school milk programme. Together the two programmes ensure adequate nutrition for school children in addition to their economy wide benefits.

In Bangladesh, smallholder mixed farming traditionally has a dairy component as indigenous cows give milk and the population has a milk consumption habit as part of daily diet. The cows are low productive due to feed constraint, diseases and poor management. Demand growth has been high due to income growth and urbanization but poor supply response of smallholder producers means that the increasing demand-supply gap is met by import of powdered milk. Commercial processing of milk collected from rural areas started in the mid 1970s by a public sector/cooperative type enterprise. The capacity of the processing industry has increased especially since the mid 1990s due to the entry of private sector processors in the industry but even now no more than 15-17% of raw milk output is processed by the formal processing sector. No consistent public policy has been pursued to strengthen the domestic dairy sector. Policies related to import of powdered milk and related tax and tariff policies primarily served the interests of powder milk importers and dairy processors. Neither consumers nor domestic producers benefited from these policies, which basically explains the poor state of the dairy sector in the country today (for a detailed analysis of the policy barriers for dairy development in the country, see Jabbar, 2010).

Smallholder producers of milk have small marketed surplus, so transaction costs of marketing such small quantities is high. Similarly, for dairy processors, collection of small quantities of milk from highly scattered small producers with poor access to good roads also entail high transaction costs. The types of market institutions and infrastructures required to address these problems and link small rural producers with urban milk consumers have not developed adequately to uplift the dairy sector. There may be many options for the development of such market institutions and infrastructure for dairy development, and dairy cooperatives or dairy groups and school milk may be important elements in this framework. Unfortunately, nothing of that sort happened in Bangladesh due to the absence of critical thinking and policy making along these lines. Dairy cooperative is a stated strategy for dairy development (GOB 2007) but very little support is available on the ground in terms of budget allocation for manpower and institution building to promote dairy cooperatives as an important vehicle for dairy development. The cooperative dairy enterprise – Milk Vita- is run by public servants with little actual participation of primary members, and it suffers from poor and inefficient management (See Jabbar, 2010 for details). School milk is not even mentioned as a tool in any policy and strategy document related to agriculture, livestock, health, food and nutrition or education (See Sixth Five Year Plan, GoB, 2011b, which is the latest most comprehensive policy document).

There is a national food policy, the main objective of which is to ensure food security for all at all times. It encompasses availability, access and nutrition or utilization dimensions of food security. There are programmes and projects related to nutrition but only one or two are related to feeding malnourished infants and pregnant mothers. There is a programme on school nutrition but that is educational and promotional focused on increasing awareness among teachers and students about balanced food and nutrition and general hygiene. There is no public or private sector supported school feeding programme operational in the country though some urban schools provide mid morning or lunch time snacks, which is usually paid by parents. There are two exceptions, however.

One is a school feeding project run by the WFP with mainly USAID donations since 2002. It involves commodity aid for local production of micronutrient fortified biscuits for distribution among primary school children on school days in a number of districts having high incidence of malnutrition. The objective is to reduce malnutrition, and increase school attendance and performance. The programme is being administered in collaboration with the ministry of education. During 2002-2004, full cost per student per year was US\$13.5 and total cost of the project was about US\$30 million, about 10% of that was provided by the government of Bangladesh. The ministry has recently decided to expand this programme with mainly government funding and some technical and financial support from the WFP (for details see section 3).

The other pilot project is a school milk project implemented by Land O, Lakes, a US NGO, with USAID funding and technical support from Tetra Pack, a giant in food processing technology. A detailed account of the project has been given in section 3. The key feature of this project is that public sector was virtually bypassed or avoided, except taking project approval from the relevant ministry, in designing and implementing the project. The reason probably was that the real intention of the project protagonists –Tetra Pack and LOL- was not to test the efficacy of school milk programme as a vehicle to develop domestic dairy as in Thailand or elsewhere. Rather the objective of the project was to test the possibility of creating business opportunities for Tetra Pack's UHT milk technology by using aid commodity (powder milk, wheat and edible oil) to run a school milk pilot as an entry point. It was a fully aid funded pilot project and no advocacy was done with public institutions to share project cost or get more involved in its management or scale it up, so the project failed to create any public sector interest to replicate it with government budget. Since the milk was given free, and full financial account of the project for implementation and governance could not be gathered from LOL, the budgetary implications of running such a project could not be assessed.

Thus it can be concluded that the Thai school milk programme made significant contribution to the development of the dairy sector and alleviate child malnutrition because of strong public policy support and budgetary commitment to the programme. On the other hand, no school milk programme has been tried in Bangladesh at any scale to test its potential for development of the dairy sector or alleviate child malnutrition which is widespread. An aid funded pilot school milk project has been implemented but without any link with the domestic dairy production and marketing activities and without involvement of the public sector in design and implementation as its primary goal was to test the potential for business opportunities for a multinational food processing company.

5 Design Considerations for a Pilot School Milk Project in Bangladesh

5.1 Choice of sites for the smallholder dairy project and implications for choice of site for the school milk pilot

It is understood from FAO RAP and Grameen Motsho O Pashushampad Foundation (GMPF) that the Bangladesh component of Project 1 (productivity improvement and enhancement of market access) will be implemented in three sites where GMPF previously implemented a UNDP funded dairy project called Community Livestock and Dairy Development Programme (CLDDP) during July 1999 to December 2005 and some remnants of that project are still in place in terms of activities and facilities. But the implementation site for project 2 (school milk pilot) is yet undecided. A decision on this will be made based on a discussion on the pros and cons of implementing in one or more sites but the choice of the site itself will largely depend on the marketing strategy adopted for project 1. Some marketing option may be suitable for linking with the school milk project, others may not be so. So a brief account of the CLDDP and its current status is presented below as a background to what might be considered as management and marketing options for the new projects, then pros and cons of various options are discussed.

5.1.1 An overview of the Community Livestock and Dairy Development Programme and lessons for the smallholder dairy project

Grameen Bank (GB) got involved in fisheries and aquaculture activities during 1986-88 by taking 25 year lease of a total of 930 fish ponds/projects covering 1000 ha spread over several districts in central and Northwest Bangladesh from the Department of Fisheries, Government of Bangladesh for aquaculture by landless poor community members to alleviate poverty. GB reorganized these ponds/projects into a number of Farms (administrative units) for management purposes. Then a multilayer system of management was introduced in which the lowest unit of a Farm was a group of landless households who would manage one or more ponds in partnership with GMPF staff on a cost and profit sharing basis. GMPF would provide training and inputs for production and assistance in marketing. The group would share feed cost, provide labour for feed distribution and keeping the pond clean, and guard the ponds against theft and get 40-60% share of profit based on the size of the pond and volume of output. In 1994, Grameen Motsho Foundation was created as an independent organization to manage the aquaculture projects of GB. However, aquaculture could not provide full time work for the poor landless households and the income was inadequate for their livelihood. So in 1999 a project was mooted to undertake integrated fish-crop-livestock including dairy farming which was called CLDDP and funding was received from the UNDP for its execution. The livestock activities were introduced in 18 upazilas in seven districts. The organization was then renamed GMPF in 2003. Some features of the project are as follows:

- A multilayer management structure was introduced. In line with the management of the aquaculture activities, three Farms were created for management of the livestock activities : Joysagar Farm covering Sirajganj, Pabna and Bogra districts; Dinajpur Farm covering Dinajpur, Thakurgaon and Panchagor districts, and Jamuna Borropit Farm covering Tangail and part of Sirajganj districts. Under each farm, at the bottom was village dairy groups each composed of a number of members who could be male or female but not all of them are landless. A number of groups were federated under a Centre and a number of centres were under the supervision of a Farm.

- The members were extended micro-credit to acquire various species of livestock under a number of livestock packages and one such package was for dairy animals. The GMPF would purchase the animals for the members based on their preference to make sure the credit was used for the intended purpose.
- An insurance scheme was introduced to cover risks of death of dairy cows and heifers (not other livestock) and a premium equivalent to 3% of the purchase value of the package was collected once every three years (initially by deducting from the approved credit). In case of death of an animal, 80% of the value of the package would be paid as compensation.
- Treatment, health care and artificial insemination services with semen purchased from the Department of Livestock Services were provided on demand at reasonable prices and regular monitoring of health and pregnancy of the cows were done. Improved fodder production was promoted by distributing Napier and other grasses.
- Community feed mills were established in strategic locations to supply quality protein feed at reasonable prices and also to sell to non-members. The members would share 70% of profit/loss of the mills though basically managed by GMPF staff.
- Community milk collection centres were established in each project site at convenient locations to collect milk from members and deliver to chilling centres (called community dairy enterprises) also established at convenient locations with total storage capacity of 16000 litres/day. Members were given 'fair' price for the collected milk but they were free to sell to other buyers if prices were better there even if this meant low capacity utilization of the chilling plants. This flexibility was allowed as the objective was to ensure increased income of the members and CLDDP plants were there as an alternative fall back outlet. A manual pasteurization unit was established in Nimgachi but was not eventually operated as production of quality product proved to be difficult.
- Processing and marketing beyond chilling was not planned in the project because of lack of scale and comparative advantage. The chilled milk was sold to commercial processors like Milk Vita, Bikrampur Dairy or to sweet makers in district towns. There was no formal time bound (short or longterm) contract with any buyer so CLDDP always had to arrange sale of chilled milk on a casual basis, hence sometimes ran into difficulties in selling milk. When the chilling plant was full and a buyer was not immediately available, members were compelled to sell to other buyers often at low prices because of low bargaining power in those circumstances.
- Biogas technology was promoted and willing households were helped to set up biogas digesters at reasonable cost.
- Members had to make personal savings with the CLDDP. The project also accumulated funds by making various levies on transactions made by the project with members and non-members or from saving from certain activities e.g. the pay out from the insurance scheme was much lower than the premium collection.

The project life finished in December 2005. Thereafter, by using funds accumulated during the project, livestock activities except dairy have been continued to some extent with credit and other technical support. In case of dairy, loan and technical support was continued where there was demand but milk collection and chilling was stopped in most project sites and continued at significantly reduced scale in a few sites reportedly because of the complexity of the dairy enterprise, especially for marketing of milk. So only 4 out of 10 chilling plants remained functional at very low capacity utilization.

No systematic *ex-post* impact assessment of the CLDDP or its subsequent activities has been done to measure the nature and extent of impact the project created and to learn what worked and what did not, and what could be done better or differently. However, some of the visible indicators of achievement and impact that can be observed on the ground include adoption of crossbred cows, improved feeding and treatment of animals, increased milk yield, production and sales, increased household milk consumption, accumulation of assets (increased number of cows owned, better quality dwelling houses out of increased income), children being schooled, better knowledge and skills in livestock rearing, and accumulation of project funds through members' savings to continue operations at some level without depending on donor funds. Quantitative information on some indicators of physical achievements made during the project and post-project periods as obtained from GMPF are shown in Table 5.1.

Table 5.1 Selected performance indicators of the CLDDP and its subsequent activities

Performance indicators	CLDDP 1999-2005	Post-CLDDP 2006-2010	Total 1999-2010
Village Group Members (VGM) for dairy	6760	4356	11116
VGM male	3197	-254	2943
VGM female	3563	4610	8173
No of milk cows/heifer distributed	4249	4840	9089
Other livestock distributed [nos]	4286	10061	14347
Dairy loan distributed [M.Taka]	106.2	121.01	227.21
Other livestock loan distributed [M.Taka]	23.4	135.05	158.45
Milk production litres (million)	5.208	8.529	13.737
Milk chilled and sold litres (million)	2.183	2.898	5.081
Community milk collection centres established	39	0	39
Chilling centres established (nos.)	10	0	10
Chilling centres in operation (nos.)	10	4	-
Mini milk processing plant established (nos.)	4	0	4
Production and sale of packed milk (nos)	92738	0	92738
Community feed mill established (nos.)	3	0	3
Community feed mill in operation (nos.)	3	2	-
Milk cows insured (nos.)	4250	4241	8491
Premium collected (million Taka)	1.98	3.59	5.57
Compensation paid (million Taka)	1.49	1.28	2.77
No of cows died	163	70	233
Bio gas plant constructed (nos.)	283	68	351
Artificial Insemination carried out (nos.)	8769	13650	22419
No of calves born	4700	8074	12774
No of services per calf born	1.9	1.7	1.8
N animals vaccinated	88215	111783	199998
N animals dewormed	13531	18105	31636
% members consume milk	100%	100%	
Livestock development fund generated (M. taka)	12.75	20.98	33.73
Personal savings fund of VGM (M. taka)	2.46	5.22	7.68

Source: GMPF, unpublished data

On the face of it, these nominal figures on various indicators give an impressive picture about project output and outcome though on close examination, some of the figures appear less impressive or even poor and they reveal additional underlying deficiencies in the design and implementation of the project.

First, during 1999-2005, 42% of milk output of the members was collected for chilling and during 2006-2010 period, the ratio was 34%. Whether farmers sold the remaining milk to other outlets by choice and at better prices is not known. During 1999-2005, 10 chilling plants with daily chilling capacity of 16000 litres actually chilled 2.183 million litres in total, which amounted to 36,383 litres per plant per year or 121 litres per plant per day assuming the plants operated for 300 days per year in 6 out of 7 years, the first year being allowed for preparatory work. Similarly during 2006-2010, 4 chilling plants with unspecified capacity chilled 2.898 million litres of milk in total, which amounted to 416 litres per plant per day assuming 300 day operation per year over 5 years. These are obviously poor utilization of the chilling capacity.

Second, since livestock, especially dairy, was introduced as a supplementary activity to aquaculture, the assets and infrastructure like milk collection centres and chilling plants started deteriorating once the project life expired and dairy activities especially milk collection was scaled down. For example, only 4 out of 10 chilling centres were operational at low level of capacity utilization, which means few milk collection centres were operational as GMPF has been facing difficulties in selling chilled milk on a regular basis. On the other hand, CLDDP members had to find other outlets to sell milk. Some of the feed mills were operational but it is unclear at what level of capacity utilization.

Third, breed improvement through AI was an important activity of the project for increasing milk yield. Services required per calf born were about 1.8 which indicated that the quality of the AI service has not been very good. Also the AI programme has been pursued without proper understanding and strategy for stable improvement of the genetic composition of the dairy animals. Cows have been inseminated with whatever semen has been available from the Livestock Department at the required time rather than following any particular breed line, and progeny records have not been kept, so the genetic composition of the substantial number of crossbred cows produced by the project members is not known, and it is observed in the field that no cumulative intergenerational genetic improvement has occurred in case of these animals. In fact the AI programme has diluted the genetic composition of the animals so much that bringing any order into the AI programme for sustained breed improvement in the project areas may prove to be a difficult task in the future but such a task deserves priority attention in the new project.

Fourth, by the end of the project life in December 2005, CLDDP had enrolled 6760 village group members in 292 villages in the seven districts under 277 Centres. About 60% of the members were male and 40% were female. However, it is possible that all enrolled members did not stay with the project for entire duration rather some might have left at some point or another due to some reason. One such possibility is when a cow had died and Table 5.1 shows that 163 cows had died during 1999-2005. Any such drop out membership should have been adjusted to get the net number of members at the end of the project life or at the end of the post-project period in 2010. Moreover, number of male members decreased in the post-project period while female membership increased, the reason for this difference is unclear.

Fifth, the 25 year lease of the fish ponds/projects expired in December 2010 and has not been renewed by the government, so the aquaculture activities have completely stopped since January 2011. The stoppage of the aquaculture operation has also apparently affected the livestock activities on the ground. Some of the milk collection centres and chilling plants established on Fisheries Department properties had to be relocated or stored somewhere else after nonrenewal of the pond lease, even if some of them were idle for years.

Given the above brief status of the CLDDP and its subsequent activities, what are the implications for the new smallholder dairy project and the proposed pilot school milk project? Overall, the CLDDP has not been replicated or scaled up or its principles adopted by any other project or organization. It is understood that the new CFC Funded smallholder dairy project will be implemented in three old CLDDP sites – Sirajganj (Nimagachi), Thakurgaon (Ranishankail) and Kuriram (Chilmari). It may be noted that Kurigram was inducted after the CLDDP was finished. Out of 2000 farmer households to be included in the CFC project as participants, 1000 will be taken in Sirajganj, and 500 each in Thakurgaon and Kurigram. Implementation modalities and specific interventions for this project are still under discussion. So based on field observations on current status of the CLDDP project sites including assets, activities and members involved, several points may be considered especially with respect to market access and marketing strategy to be adopted for the new smallholder dairy project.

First, the CLDDP dealt with its various components in isolation and did not try to develop dairy as an integrated economically viable replicable model. For example, dairy cooperatives in Thailand have built a business model according to their size and ability, so some have only collection centres and chilling plants selling chilled milk to large processors while others have gone into pasteurization and some large ones have both pasteurization and UHT processing facilities. But irrespective of scale, each is run as a business, which is a key, among other factors, for success of the Thai dairy sector. Initially cooperatives were promoted and supported by government by providing credit, management, skill and accounting training. CLDDP could have adopted a strategy to organize a cooperative around each chilling plant by federating village dairy groups that were within the supply hinterland of that plant, and give them adequate management and accounting training to run as self-managed units. Experiences of both the Thai cooperative development and the Indian Amul cooperative development could be taken into account in pursuing such a strategy.

Second, even though farmers were organized into small groups, they were always managed by CLDDP or GMPF and no real effort was made to make them self managed groups that could take over their own management on completion of the project. Various project assets e.g. feed mills, collection centres, chilling centres, various funds and savings were named as community enterprises or assets or funds, yet at the end of the project, those have been retained or internalized by GMPF for other activities rather than handing them over to the CLDDP members or their organizations for sustaining their dairy and other livestock operations. As a result, perhaps many members had to discontinue dairy and other had to find alternative market outlets for their milk.

Third, processing beyond chilling was not considered in CLDDP perhaps for good reason. But a proper marketing strategy for selling chilled milk was not developed and no plan was made to prepare the village groups to find other outlets for selling milk in the absence of GMPF nor was there any plan to handover the physical facilities to the dairy groups after the expiry of the project. So when the project life expired, project assets (chilling plants and

collection centres) became largely idle in Sirajganj site and completely idle in Thakurgaon site, Kurigram had no such facilities. On the other hand, farmers had to deal with an open uncertain milk market. Other processors were slow in coming to establish collection centres and chilling plants. Some processors have recently established collection and chilling centres in Sirajganj site, who are now competitors but no processor has established collection centres in Ranishankail in Thakurgaon or Chilmari in Kurigram.

In reality, CLDDP had all the opportunities and potentials to test the economic viability of a cooperative dairy model if farmers were organized into reasonable size cooperatives around a chilling plant, a proper marketing strategy was developed, training was provided in management, skills and accounting to make them self managed and self-sustaining. There should have been an exit strategy in which the grant aided assets should have been transferred to the cooperatives recognizing them as real owners rather than internalizing them by GMPF for other activities or by keeping them idle. GMPF could continue overseeing the transition for some time and assist the cooperatives from outside with advice and facilitation to self-manage rather than directly doing the management as in the project period. GMPF could disengage from the groups once they fully graduated in management of their affairs.

5.1.2 Marketing strategy for the smallholder dairy project and implications for link with the school milk pilot

Given the above background of the CLDDP, what should be the implementation and exit strategy for the new productivity and market access project? Especially what should be the marketing strategy? Should there be site specific strategies or a common strategy for all three sites? And where does school milk fit as an element? Assuming that the lessons from CLDDP will be used to develop an organizational model and an exit strategy, possible marketing strategy options that can be considered and their pros and cons are summarized in Table 5.2

Comparison of the various options indicates that, everything considered, options e and f rank high for making a choice between them as advantages of these options outweigh their disadvantages and they are better than all other options. While negotiating with processors, potential for creation of goodwill for their products may be highlighted along with benefits to be derived from contribution to the school milk as a corporate social responsibility.

Next in rank may be option c but widely dispersed three sites – two of which are fairly small in terms of membership – is a major handicap for organizing a central processing facility and a corresponding marketing strategy. If this option is chosen, portion of sales proceeds has to be used to buy UHT milk from a processor or fermented milk or yoghurt from Grameen Danone. Consequently, direct link between the smallholder dairy and the school milk projects will be lost and the principle of ‘local milk for local school’ will also remain unfulfilled.

Option d has something to recommend it provided GMPF first decide if they want to have a short term vision and keep their plans within the limits of the two current projects, like they did with the CLDDP, or have a long term plan in which the current projects will be used as an initial platform. If the longer term vision is chosen, they should have some ideas about where they want to go and how, then use the resources from the two current projects to jumpstart that process. Such a thought may also guide negotiation strategy to be pursued with Tetra Pack or other foreign based providers of UHT technology.

Table 5.1 Milk marketing options for the CFC project and their pros and cons including implications for school milk

Milk marketing option	Pros	Cons
a. Sell chilled milk to a large processor e.g. Rangpur Dairy, Aarang Dairy, Pran Dairy under time bound contract minus required amount for school milk	<ul style="list-style-type: none"> Available chilling equipment can be used in all three sites, so no capital expenditure will be required for processing, and no major cost for marketing Sale can be split, e.g. Thakurgaon and Kurigram product may be sold to Rangpur Dairy, Sirajganj product to Aarang or Pran 	<ul style="list-style-type: none"> Finding buyers willing to pay reasonable price may be very difficult, especially in Thakurgaon and Kurigram Link with school milk need to recognize that there is no tradition of drinking cold milk among children, so implication of drinking cold milk and cold chain to supply safe cold milk need to be addressed.
b. Add mini pasteurization plant to chilling plant at each site (2000 l/day capacity in Ranishakail and Kurigram and 15000 l/day in Sirajganj) for school milk and sell chilled milk to others	<ul style="list-style-type: none"> Allow entry into pasteurized milk market with own brand (need to decide which name) Because of small scale, local district markets may be targeted with the slogan "local milk for local market" 	<ul style="list-style-type: none"> Small scale plant may be costly and uneconomic to operate, especially in Thakurgaon and Kurigram and finding a supplier within short time may be difficult Assurance of quality standard may be difficult as experienced in Nimgachi under the CLDDP so staying in the competitive local market may be difficult Link with school milk needs to recognize that there is no tradition of drinking cold milk among children, so implication of drinking cold milk and cold chain to supply safe cold milk need to be addressed. Entry into larger city markets may be difficult so marketability of collected milk may be a problem Pasteurized milk may be boiled before serving, but a strong cold chain for delivery and storage, and boiling facilities at school will be required. Both are expensive and operationally unsuitable
c. Create a central facility for about 20000 l per day pasteurization capacity collecting milk from three sites	<ul style="list-style-type: none"> As in case of b. Because of slightly larger size, some economy may be gained in plant establishment and processing cost 	<ul style="list-style-type: none"> Finding a supplier of pasteurization plant within a short time may be difficult. Milk collection and marketing costs will be high, uneconomic and Uncompetitive due to dispersed project sites Link with school milk unsuitable and expensive

d. Add mini UHT plant to chilling plant at each site or at a central place (see last column) for both school milk and outside sale	<ul style="list-style-type: none"> Long shelf life and no need for cold chain will allow access to district towns and rural markets with own brand and with the slogan "local milk for local market" Highly suitable for school milk pilot Larger city markets may be targeted later through marketing agencies Possible to think beyond the project size and its life; subject to availability of funds, create a plant to process milk collected from all three sites -members and non-members- to achieve economies of scale. This will make exit easy as established market link can be continued by stakeholders after project life 	<ul style="list-style-type: none"> Tetra Pack is the only current supplier of UHT technology in Bangladesh. Minimum plant size they are willing to help establish is 20,000 l/day at the cost of about Tk 250 million or US\$ 3.38 million. Daily running cost will be TK 160, 000 or US\$2200. Both are prohibitive for the current project budget. May not be competitive with other UHT processors
e. Sell chilled milk to a large processor having UHT facility e.g. Rangpur Dairy, Aarang Dairy or Pran Dairy under time bound contract and buy required quantities of UHT milk for the school milk pilot.	<ul style="list-style-type: none"> No need to invest in processing equipment and marketing logistics Sale can be split, e.g. Thakurgaon and Kurigram product may be sold to Rangpur Dairy, Sirajganj product to Aarang or Pran Overall marketing cost may be less than in other options Highly suitable for school milk pilot Arrangement may be mutually beneficial if both parties recognize the importance of smallholder dairy dev and see complementary roles rather than as competitors This will allow an easy exit as established market link can be continued by stakeholders after project life 	<ul style="list-style-type: none"> May be difficult to find a buyer for chilled milk having UHT facility on reasonable terms Cost of collection of raw milk and delivery costs of chilled milk likely to be high, especially for Thakurgaon and Kurigram due to distance. Split sales may reduce cost. "Local milk for local market" will be limited to the small school milk component
f. Sell chilled milk to Grameen Danone under time bound contract and buy back required quantities of fortified yoghurt or Fermented Milk for school milk project	<ul style="list-style-type: none"> No need to invest in processing equipment and marketing logistics Overall marketing cost may be less than in other options Fermented milk highly suitable for school milk pilot with minimum logistic for distribution Fortified yoghurt also suitable for school milk subject to establishment of delivery cold chain Arrangement may be mutually beneficial as the importance of smallholder dairy dev is recognized by both parties This will allow an easy exit as established market link can be continued by stakeholders after project life 	<ul style="list-style-type: none"> Establishment of delivery cold chain for fortified yoghurt for school milk likely to be difficult and expensive especially if school pilot is located in Thakurgaon or Kurigram due to distance "Local milk for local market" may not be visible as it will get diluted with Grameen Danone's overall processing operations

Given the above, either Sirajganj or Thakurgaon may be chosen for piloting the school milk project and appropriate protocol detailing terms of delivery may be signed by the school milk project with the smallholder dairy project and other relevant parties for supply of milk. The chilling plants in both the sites are currently located in inappropriate locations, so whichever site is chosen, the chilling plant needs to be relocated to a new site with adequate space and good access road. Sirajganj has good access to market for raw or chilled milk as other dairy processors are there as competitors and because of the presence of other operators, piloting school milk may face problem. Thakurgaon is fairly isolated so school milk can be tested without the influence of other interventions but it has poor access to milk market and long distance may mean operations will be expensive.

5.2 Organization and management of the school milk pilot

5.2.1 Factors to be considered in deciding implementation modalities

A pilot project is essentially an experiment to test one or more hypotheses. In an action oriented pilot project, the purpose is to test how to do certain thing to achieve certain goal or objective, and to learn what will work and what will not, and why. The lessons learned can then be used to better design for scaling up or replicating the project activities or to do nothing if nothing really worked in the pilot.

School feeding programmes (SFP) with or without milk have been in place as routine or in project form in both developed and developing countries for several decades. Much research has been conducted on the system of governance and impact of such programmes. But it is not always easy to draw conclusions about success or failure of such programmes/projects based on individual project studies. Adelman et al. (2008) reviewed impact of SFP (food for education programmes – both in-school feeding and take home food but no milk content) in a number of developing countries and found that such programmes had significant impact on school attendance of enrolled students, especially where baseline attendance was very low and malnutrition severe. Potential impacts on school participation by children not previously enrolled in school are not well known. There is mixed evidence that school meals can improve performance on math and literacy tests, and they may improve cognitive development, depending on the type of food provided, the size of the food rations, and programme duration.

Greenhalg et al. (2007) conducted a critical review of 18 SFP (reported in 29 articles) in disadvantaged children that included trials from five continents and spanned eight decades. Although they found that the programmes had significant positive effects on growth and cognitive performance, the trials had many different designs and were implemented in varying social contexts and educational systems; by staff with different backgrounds, skills, and cultural beliefs; and with huge variation in the prevailing social, economic, and political context. Because of such diversity of situations, the authors closely looked at aspects that determined success and failure so that policy makers and project designers can decide on the type of projects that should be implemented. They identified three categories of factors : factors that appeared to enhance efficacy of SFP, factors that appeared to reduce efficacy, and factors under which SFP appeared not to work. These are summarized below.

Factors enhancing efficacy of SFP

- Target group has clear nutritional deficiency, especially inadequate energy intake, and pilot is oriented to correcting this rather than to short term hunger relief

- Intervention designed by or with local teams having knowledge about local problems, norms and culture rather than designed by distant ‘experts’ having no or little local knowledge
- Well organized schools that form part of an efficient distribution chain for the food supplement to be offered
- Measures are in place (e.g. close supervision of eating) to ensure that the supplement is consumed at school
- Palatability and acceptability of the product is confirmed beforehand, and persons having intolerance or allergy to the product are excluded
- Use local ingredients and cooking methods (in case of supplying cooked food)
- In extreme poverty, intervention is designed so that attending school is more economically viable than keeping children at home
- Intervention seeks to induce a change in home diet by educating or inspiring children

Factors reducing efficacy

- Participants are not aware of, have not signed up to, or trained to take account of the objectives and methods of the pilot
- Design involves role conflicts or ethical difficulties for staff or project implementers, e.g. targeting some students and not others, which then creates the possibility of violating rules from both supply and demand sides
- Insufficient measures in place to reduce confounding actions e.g. benevolent attention given to some target object or distribution outside target population
- Adverse prevailing policy e.g. policy conflict with pilot project objectives

Factors making SFP unworkable or ineffective

- Food offered provides too little of the missing nutrient or is not consumed due to unpalatability or other reasons
- Supplementation occurs too late to impact on growth and cognitive ability as it is known that supplementation needs to be given as early as possible
- Compensatory reduction in food given at home when school meal is substantial, which is likely to occur among extreme poor households due to insufficient food supply at home for the entire family
- School food may reduce bioavailability of some nutrients, e.g. milk supplement may reduce the absorption of iron and zinc in some circumstances

These experiences from around the globe are useful for designing the school milk pilot project under consideration. And these should be shared and discussed with all stakeholders at the beginning of project implementation so that the stakeholders may appreciate the objectives of the project, give adequate consideration to pros and cons of various factors that may help or hinder the operation and success of the pilot as well as what need to be done to make them work.

5.2.2 Choice of schools and grades to be served

The pilot project intends to serve 2000 primary school students preferably in one site or upazila. Once the upazilla is chosen based on options and discussion in section 5.1.2, the next step is to decide types of schools and grades to be included in the programme. Generally there are three types of schools – government primary school, registered or government approved primary schools and government approved madrashas (latter two are not directly

government schools but get government grant to meet part of cost). Outside these, there may be informal or nonformal schools run by BRAC or other NGOs, unapproved madrashas and privately run unapproved kindergartens in some upazila towns. For purposes of this pilot project the first three categories should be chosen. The difficulties of inclusion of other types may be guessed from the experience of the LOL executed school nutrition programme discussed in section 2.

The next question is whether all students or certain grades in a primary school should be served. Thai school milk programme served only kindergarten students in the first three years, then added other grades gradually reaching 6th grade in the 17th year after inception. The reason was that the objective was to address the problem of malnutrition among children and it is well known that supplementation given at the earliest stage of infancy has the highest impact. Nutritional impact diminishes with age and may be negligible beyond certain age. In Bangladesh, kindergarten schools are rare in rural areas and attendance in primary school begins at the age of 6, which is already late for achieving maximum nutritional impact from milk supplementation. Therefore, even though incidence of malnutrition is generally high in Bangladesh, in order to create maximum impact with limited available resources in the pilot project, it will be advisable to include only grades 1 and 2. It will be possible to monitor students in these two grades for up to three years, which is the duration of the project. If all grades are served, students of grades 3-5 will leave after one or two years with the project so impact on them can't be assessed fully and properly.

A relevant question is if school teachers should be provided with milk packs, and if so which teachers. Normally there are only 5 teachers in a standard primary school and three of them – the Head teacher and two class teachers - will be directly involved in the project giving quite a bit of time. Other teachers will also need to stand by or provide occasional help in some form or other so it is justifiable and advisable to include all the teachers and staff (e.g. the bell boy, the cleaner) in the recipient list and adequate provision should be made for them with the proviso that once list has been made and agreed, that should be strictly adhered to. Recall that slackness due to ethical lapses or benevolent behaviour in distribution reduces the efficacy of the school feeding programme.

There may be 50 or more primary schools in the three categories in a upazila. So only a subset of these can be covered in the project to accommodate 2000 students. The number of schools to be included to cover 2000 students will depend on the number of students in the two grades in each school. In the absence of any objective criteria to include or exclude a school, there may be problems of choice, especially local power structure may interfere and influence choice and the resulting choices may mean highly dispersed schools, which may create problems of logistics for distribution of milk. If for convenience in administration of the pilot, a less dispersed distribution is desired, then a central point may be chosen at first, say the primary school at the centre of the upazila HQs. Then the radius may be increased from that point to include additional schools until 2000th student is found. However, in this process, some schools are found which do not have adequate or secured space or store for storing milk or may have other inadequacies to properly run the programme. In such cases, local stakeholders need to be involved to decide about their status. Once this is done, a list of the chosen schools should be made. This exercise will require the permission and help of the upazila Education Officer, rather informally as a preparatory work prior to the Ministry's formal approval, so he/she needs to be briefed and his/her assistance sought in preparing the basis for seeking permission from the ministry.

In order to work with the chosen schools as partners, approval of the Ministry of Primary and Mass Education will be required. Given its status as a company or NGO, GMPF should also explore if permission from the NGO Bureau or any other authority will be required. The application for permission should include (a) brief background to the project and its objectives, (b) the choice of the upazila and its justification, (c) criteria and method for choice of schools in the upazila and the list of the chosen schools, (d) grades and number of students to be served in each school and duration, (e) request to authorize chosen schools as well as the upazila school administration authority to collaborate with the project and actively participate in its implementation. Permission from the Ministry of Health and family Planning will also be required as Upazila Medical and Public Health officials need to be involved (see below)

5.2.3 Management structure for the project

Successful management of the project will require active participation of all stakeholders under clearly defined roles, responsibilities and accountability. In order to achieve this, a simple but effective management structure needs to be developed. The structure may include

- (a) a School Milk Management Committee (SMMC)
- (b) a School Milk Project Committee (SMPC)
- (c) the School Milk Project Office (SMPO)
- (d) The Head Teachers of participating schools

The role of the SMMC is to provide oversight and overall supervision including formulation of rules, norms and principles for running the project, to evaluate progress, undertake periodic audit of accounts and quality of products and services, and to settle any problems and disputes. Members of this committee may include:

- Upazila Education Officer as Chair or Convenor
- Upazila Medical Officer
- Upazila Public Health Officer
- A representative of the civil administration
- Head Teachers of the project schools
- Chairman of each Participating School management Committee
- One or more Municipal Authority/ Union Parishad chairman
- School Milk Project representative (may serve as member-Secretary)

The SMMC may meet once every quarter or more frequently if required to deal with urgent issues.

The role of SMPC is to see more routinely and closely than the SMMC that the project is run according to adopted and agreed procedures and to address urgent problems and issues that may arise, e.g. problems arising out of untimely delivery or nondelivery of a consignment, poor quality of products delivered, pilferage of stock from any school etc. The decisions of SMPC should be sent to the SMMC for information and approval ex post. This committee may include :

- Upazila Education Officer as Chair or Convenor
- Upazila Public Health Officer
- Two Representatives of the Head Teachers on the SMMC
- School Milk Project representative (may serve as member-secretary)

The SMPO will work under the guidance of the SMMC and the SMPC for dealing with routine day to day affairs of the project, including arrangement of all logistics for acquisition and distribution of milk, keep records and accounts, monitor quality and safety of milk along the entire supply and distribution chain, assure consumption at school and environmentally safe disposal of packets.

At the school level, the primary responsibility lies with the Head Teacher, who is expected to engage relevant class teachers to assist him/her in the execution of the programme. The responsibilities include giving requisition and taking delivery and storage of supplies, monitoring quality and safety of products, distribution to classes, assuring consumption at school, keeping records and accounts, and arrange environmentally safe disposal of packets, bring any issue or problem to the attention of the SMPO etc.

5.2.4 Organization and implementation of the project

Several steps and/or tasks are involved in the implementation process. Some are required in the beginning to launch the project and others are to be routinely followed. Heset (2010) has recommended a number of best practices in the organization and management of school milk programmes giving specific examples from a number of countries. However, best practices need to be adapted to local conditions to make them effective. Using those as guides and giving consideration to practices in other developing as well as developed countries, the following steps are suggested for organization and implementation of the proposed school milk project.

Establish supply chain from supplier up to school store room and set up logistics like store room or store space, refrigerators, cool boxes, cool bags or other tools as required. This will require making transaction contracts between parties at every step in the chain, e.g. between the school milk project and the milk supplier for delivery to the upazila store, between local transporters and project office to deliver to participating schools. Actual form of equipment and arrangement will vary partly depending on the type of product – UHT milk, fortified yoghurt, fermented milk - to be ultimately chosen for the programme.

The contract with the milk supplier should specify, among others, that the milk packs (UHT milk or yoghurt or fermented milk) must be made out of raw milk and not powder milk, and that the firm must supply own produced product and not buying from a third party, that specified type of transport vehicle has to be used for delivery, and the firm must agree to inspection if required by public health and food standard authorities.

The contract with local transport service providers should also include, among others, the specification of type of transport vehicle to be used, the schedule of collection from store and delivery to the school.

Conduct orientation sessions for project stakeholders to create awareness about objectives of the project, roles of various stakeholders and knowledge from other countries and Bangladesh about factors responsible for success and failure of such projects, so that stakeholders may understand their expected roles. In such sessions, small and large posters and leaflets on purpose of school milk may be distributed. Such materials may contain information on properties of milk, its nutritional value, effect of malnutrition in children and role of school milk. The posters should be widely distributed in the community and hanged

on school notice boards. Also videos or other visual materials on school milk programme obtained from other countries may be shown.

Conduct more intensive sessions with school staff, other project staff and community members who are more directly responsible for execution of activities on a daily basis. The purpose will be to discuss and agree on specific roles and responsibilities of each staff involved. In this discussion various protocols or procedural matters, forms for records and accounts and how to use them at what frequency should be thoroughly discussed with responsible staff. The following handouts and forms should be used.

Procedural protocols to be distributed to schools :

- Attribute of school store room (dry, clean, secure door and windows, screen in windows, sufficient capacity, pallets or shelves for milk storage)
- Stock management procedure (first in first out, stock movement records, status of unused packs and requisition adjustment, regular inspection and sign up on finding on number, quality/state of packs, losses etc)
- Daily distribution and consumption procedure (dedicated school focal person, withdrawal procedure from store, distribution procedure in classroom (e.g., only those present, line up for delivery or stay at seat, any other courtesy), consumption procedure, consumption recording, collection and disposal of used packs)

Recording forms to be distributed to schools

- Forms for recording stock movements e.g. way bill, school ledger, store room stock sheet, individual student consumption record (this may be different from school attendance register)
- Baseline data form to collect student data on initial health status (age, height, weight, other health indicators, food allergy status, family information (size and composition, food consumption behavior and status especially status of milk consumption at home etc), attendance record, class performance record
- Periodic record on students including end of project record (yearly record on age, height, weight and any record on major sickness during the year, any major change in consumption status at home)

Implement the activities

- Conduct the baseline survey. Teachers, students and their parents need to be informed before filling the form and its purpose explained. Teachers need to be trained or guided in filling the form.
- Ensure initial stock of milk packs
- Start distribution and consumption and monitor acceptability or rejection and appropriate steps to address findings
- Continue distribution, consumption, data collection and monitoring
- Conduct end of project survey (actually third yearly record will do that but additional information may be collected on household characteristics if impact analysis includes analysis of associative or causal factors)
- Analyze data for impact, and also summarize lessons on project design and implementation procedure.

The review of literature presented earlier showed that there is enough evidence to show that school milk has significant impact on attendance and performance through improving

nutritional status. Therefore question may arise if this project needs to collect data or keep records to make similar impact assessment. In theory, there may not be a need to keep records or analyze data to prove that school milk will also work in the pilot project area. But practically, without maintaining a rigorous discipline in the distribution and consumption of milk at school, the main purpose of the project will be lost as lack of discipline and record keeping may lead to significant pilferage, take home and shared consumption with other household members, and worst, some packs may even end up in the market. On the other hand, a little bit of extra work on record keeping done in a systematic manner may generate good quality data for analysis by scientists and some new knowledge and insights on school milk impact and its management procedure may emerge. So it is worth investing some time and effort in proper record keeping on students.

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Appendix A

Organizations Visited and People Met in Dhaka

11.8.2011	Mr Naser Farid, Dr M A Mannan and Dr Lalita Bhattacharjee, FAO National Food Policy Capacity Strengthening Programme (NFPCSP), Dhaka
16.8.2011	Mr Nurul Amin Siddiquee, CARE Dairy Value Chain Project, Dhaka
18.8.2011	Dr Shamsul Alam, Member GED, Planning Commission, Dhaka
24.8.2011	Mr Ehsanul Bari, CEO, Mr Badrul Alam, Manager, Greameen Motsho O Pashushmalpad Foundation (GMPF), Dhaka (also met on 26.9.2011)
5.9.2011	Mr Sayef Nasir, Country Manager, Tetra Pack, Dhaka
18.9.2011	Ms Corinne Bazia , CEO, and and Luc Jonveaux, Project Officer, Grameen Danone, Dhaka
2.10.2011	Mr Ekramul Kabir, Country Manager, and Mr Abdulla-Al-Baqui, Programme, Manager, Land O'Lakes, Dhaka
4.10.2011	Mr Rezaul Karim, Head, Programme Implementation Section, World Food Programme, Dhaka

Mission to Thailand : Itinerary and People Met

6. 9. 2011	Tuesday
1715	Arrive Bangkok
7. 9. 2011	Wednesday
0800	FAO RAP: Review the objectives of the mission and the programme Dr Vinod Ahuja, Livestock Officer Mr Thanawat Tiensin,
1000	Dairy Farming Promotion Organization of Thailand (DFPO), Ministry of Agriculture and Cooperative (MoAC) Mr Suchart Chariyalertsak, Assistant Director and Secretary of Milk Board and Head of School Milk Board Administration
1400	Department of Livestock Development (DLD), MoAC Mr Sinchai Ruengpaibul, Expert on Dairy Extension Mr Jaruwat Nutdechanan, Senior Dairy Adviser
8. 9. 2011	Thursday
0800	Leave for Nakhon Pathom Province
0930	Kamphaengsaen Dairy Cooperative Mr Tanai Lertpiam, Chairman of the Cooperative Mr Sungwan Timhuam, Manager of the Cooperative Several other support staff
11.15	Ban Or Kra Ting Primary School, Kamhaengsaen Mr Payap Unhapongsa, Director and other staff
1330	Kasetsart University, Kamhaengsaen Campus, Faculty of Veterinary Medicine, Department of Large Animal and Wildlife Clinical Service Dr Theera Rukkwamsuk, Associate Professor Dr Pipat Arunvipas, Associate Professor

1430 Huay Kluang Sub-District Administration Authority, Kamhaengsaen
Mr Preecha Salee, Vice-President
1630 Return to Bangkok

9. 9. 2011 Friday

0600 Travel to Sa Keow province
0930 Wang Nam Yen Dairy Cooperative
Mr Amnuay Thong Koh, Chairman
Sathit Pitivara, Manager
Mongkolchai Thongkok, Deputy Manager
Ms Rattana Chinpakdee, Secretary to the Chairman
1400 Wang Nam Yen Municipality
Wangchai Nareerak, Mayor
1500 Wang Nam Yen Primary School, Pre-school section
1900 Arrive Bangsaen, Chonburi Province

10. 9. 2011 Saturday

1000 Baan Bueng Dairy Cooperative, Chonburi Province
Mr Jare Nanatapisan, Chairman
Boon Siriwan, Secretary and sSeveral members of the Committee
1330 Dairy Farm
1630 Arrive Bangkok

11. 9. 2011 Sunday

12. 9. 2011 Monday

0810 FAO RAP for debriefing
Dr Vinod Ahuja, Mr Thanawat Tiensin

13. 9. 2011 Tuesday

0700-1300 Bangkok- Dhaka

**Mission to Dinajpur, Bogra and Sirajganj in Bangladesh
(with Grameen Motsho O Pashusampad Foundation)**

Itinerary and People Met

19. 9. 2011 Monday

0730 Leave Dhaka
1830 Arrive Dinajpur
Mr Ashish Kumar Misra, Manager, Dinajpur Farm

20. 9. 2011 Tuesday

0730 Leave for Ranishankail Upazila In Thakurgaon district with Mr Misra
1000 Arrive Ramrai Unit, Ranishankail

Visited Chilling Centre, VGM Centre meeting, Primary School, several dairy farms

1500-1900 Ranishankail- Bogra

21. 9. 2011 Wednesday

0630 Leave for Shariakandi with Grameen Danone Team
Corinne Bazina, CEO
Luc Jonveaux, Project Officer

Visited two milk collection centres, several dairy farmers in Shariakandi, Danno Processing Plant in Bogra, a Shakti Lady (yoghurt retailer), a RVS (Ricshaw Van Seller) of yoghurt who supplies the Shakti Ladies and other retailers in Gabtali.

With Mr Bulbul Ahmed, CARE Project Manager, and Luc visited Hatibandha primary and Secondary school to see CARE-Danone Japan project on Health, Nutrition and Food Security Project – a project for promotion of hygiene and nutrition concepts among young children.

22. 9. 2011 Thursday (off due to hartal)

23. 9. 2011 Friday

0730 Leave for Joysagar Farm, Nimgachi, Sirajganj
0900 Briefing at the Nimgachi office
Mr Motahar Hossain and several colleagues

Visited several dairy farms, feed mill, chilling centre in Nimgachi, Tarash area

1430-1800 Nimgachi-Dhaka

Appendix B

Criteria and Guidelines for the Thai School Dietary Supplement (Milk) Project According to the Resolution passed by School Dietary Supplement (Milk) Management Sub-Committee at Meeting No.1/2010 on 29 January 2010

1. The criteria for selecting entrepreneurs to join the project

- 1.1 The entrepreneurs have been granted Permit for Factory Operation.
- 1.2 The entrepreneurs have been granted Food Production Permit.
- 1.3 The entrepreneurs have been granted Certificate of Food Recipe.
- 1.4 The entrepreneurs have been granted Certificate of Good Manufacturing Practice Procedures by Food and Drug Administration and have passed the inspection of a place of production in the last 12 months and can present the formal Inspection Report.
- 1.5 The entrepreneurs have signed MOU to purchase milk from raw milk sources and the entrepreneurs must ensure that they will purchase the raw milk throughout 365 days according to the price and standard of raw milk purchase set by Dairy Cow and Product Committee.
- 1.6 The entrepreneurs do not have any overdue bill to pay any farmer or agricultural institute.
- 1.7 The entrepreneurs are the producers. They cannot hire other entrepreneurs to process milk or administer for them. Except for UHT milk, the entrepreneurs who have the contract to sell mainly pasteurized milk can hire others in case the amount of raw milk is higher than the amount of pasteurized milk distribution and during school breaks.

2. Criteria for granting rights and designating school milk distribution areas to entrepreneurs in the project

- 2.1 The entrepreneurs are granted the rights in accordance with the amount of raw milk specified in MOU that they have signed with The Cooperative Promotion Department (only MOUs in School Milk Project) and this amount has to accord with the real amount of raw milk being purchased.
- 2.2 In the budget year for 2010, the rights and school milk distribution areas will be granted and designated according to the MOUs signed in 2009-2010 (1 October 2009–30 September 2010) since MOUs were already signed. However, in the budget year for next year, the potentials of entrepreneurs, their past conduct, and other criteria set by the Committee, will be taken into consideration before specifying the amount and designating the distribution areas in the new MOUs.
- 2.3 The amount of 1 ton/day of raw milk, being produced and purchased 7 days a week, will become 4,800 bags or cartons of milk per day (calculate the volume by subtracting specific gravity and 1% loss). The entrepreneurs will be granted distribution rights or deliver 6,720 bags or cartons of milk to schoolchildren 5 days a week. In another word, 6,720 students per day get to drink milk.
The amount of raw milk according to MOUs signed in 2009–2010 totals 1,211 tons per day. The milk will be distributed to 8,137,920 students. This number is close to the number of pre-school children and schoolchildren in 1st to 6th grades in primary schools nationwide in 2010.

- 2.4 After each entrepreneur is granted the rights to distribute certain amount of milk, the distribution areas or the delivery areas of school milk to schoolchildren will be designated. The allocation criterion in each province specifies that there should be at least 2 entrepreneurs and distance will be taken into consideration to ensure fairness.

Regarding the distribution rights or the delivery areas of school milk to schoolchildren in the 2nd semester in 2009, the organizations which have not purchased any milk, especially private schools, which receive the budgets for the first time this year, first the rights will be granted to Dairy Farming Promotion Organization of Thailand which will purchase surplus raw milk according to resolutions No. 8/2009 and No. 9/2009 passed by Dairy Cow and Product Committee and then the rights will be granted to the entrepreneurs who produce UHT milk from raw milk that they cannot distribute in the 2nd semester in 2009. Concerning the criteria of distribution rights, Dairy Farming Promotion Organization of Thailand, the entrepreneurs, and the distributors can discuss and come to a conclusion together.

- 2.5 After the rights are granted, the distribution areas are designated, or the milk is delivered to all schoolchildren nationwide, the list of entrepreneurs and delivery areas will be made and sent to Local Administrative Organizations, private schools all over the country, and the entrepreneurs. The purchasing contracts between Local Administrative Organizations or distributors and Dairy Farming Promotion Organization of Thailand or the entrepreneurs to whom powers of attorney are given by Dairy Farming Promotion Organization of Thailand, then will be signed.

The entrepreneurs will receive powers of attorney from Dairy Farming Promotion Organization of Thailand. They will sign guarantee agreements with Dairy Farming Promotion Organization of Thailand. Each entrepreneur should also present Letter of Guarantee issued by a bank, collateral or guarantor to Dairy Farming Promotion Organization of Thailand. The collateral cannot be worth less than 5% of the value specified in the MOU. All entrepreneurs have to comply with conditions set by Dairy Farming Promotion Organization of Thailand and School Dietary Supplement (Milk) Management Sub-Committee.

3. Guidelines on the Purchase of School Milk by Local Administrative Organizations (LAOs) and Private Schools

- 3.1 Dairy Farming Promotion Organization of Thailand sends the LAOs and private schools nationwide the list of entrepreneurs.
- 3.2 Dairy Farming Promotion Organization of Thailand gives powers of attorney to the entrepreneurs in the list so that the LAOs and private schools can sign purchasing contracts with these entrepreneurs in their areas.
- 3.3 The LAOs and private schools sign purchasing contracts with Dairy Farming Promotion Organization of Thailand or the entrepreneurs to whom powers of attorney are given by Dairy Farming Promotion Organization of Thailand. The special purchase procedure is adopted when signing contracts with the LAOs as specified in the Cabinet's Resolution on 15 December 2009 and the Resolution passed by Committee on Granting Privileges to Organizations and State Enterprises (The Comptroller General's Department) on 14 January 2010.
- 3.4 The entrepreneurs deliver school milk to the LAOs and private schools as specified in the purchasing contracts. The purchasing contracts shall state that the

LAOs and private schools pay the entrepreneurs monthly after the entrepreneurs deliver due amount each month. The entrepreneurs shall receive the power of attorney from Dairy Farming Promotion Organization of Thailand to ask for payment from the LAOs and private schools.

4. Guidelines on School Milk Transportation and Storage

4.1 The Transportation of School Milk by Entrepreneurs

- Pasteurized milk must be transported in a truck equipped with cooling system. The temperature shouldn't be higher than 4 degrees Celsius. The cold temperature has to be maintained at all time while transporting the milk. In the 2nd semester in 2010, all school milk has to be transported by a truck equipped with cooling system.
- UHT milk must be transported by a container truck or a truck which has roof or is covered with canvas. The school milk packed in paper boxes can be laid on top of each other but not higher than 10 boxes in a row.

4.2 The Storage of School Milk by the LAOs or Distributors

- Pasteurized milk has to be stored in the refrigerators. If it will be kept in a container, the container has to be clean and the ice used has to be clean. The temperature has to be maintained at not higher than 8 degrees Celsius.
- UHT milk has to be stored in a clean area where animals which carry diseases cannot gain access to. The UHT milk has to be packed in the paper boxes and these boxes can be laid on top of each other, but not higher than 8 boxes in a row. The paper box which is covered with plastic film can be laid on top of each other, but not higher than 5 boxes in a row. The UHT milk has to be kept in a raised area, at least 10 centimeters higher from the ground. The temperature should not be higher than 45 degrees Celsius. The area shouldn't be wet nor directly exposed to the sun.

5. Measures to Monitor and Control the Distribution of School Milk in School Milk Dietary Supplement (Milk) Project

5.1 A Committee on Monitoring and Controlling School Milk Quality will be established. This committee is a sub-committee appointed by Dairy Cow and Product Committee.

5.2 A Provincial Committee on School Dietary Supplement (Milk) Project will be established to monitor and control School Dietary Supplement (Milk) Project in the areas. The governors appointed the deputy governors to be a chair of the former School Dietary Supplement (Milk) Project. There were representatives of the LAOs and relevant individuals serving in the committee. Animal Husbandry Official served as a secretary and Cooperative Official served as an assistant secretary in the committee. All former members of the committee still serve in the present Provincial Committee on School Dietary Supplement (Milk) Project. The chair of Dairy Cow and Product Committee appointed the Deputy Director General of Department of Livestock Development to be a chair, Bangkok Animal Husbandry Official to be a secretary, and Director of Office of Cooperative Promotion in Area 1 and 2 (Bangkok) to be an assistant secretary of the former Bangkok Committee on School Dietary Supplement (Milk) Project. All former members of the committee still serve in the present Bangkok Committee on School Dietary Supplement (Milk) Project.

- 5.3 The entrepreneurs, who do not comply with the criteria and guidelines on School Dietary Supplement (Milk) Project, who give false information to the relevant committees, and whose products don't meet the standards required, the contracts will be terminated.

6. The Distribution Prices

The LAOs and private schools purchase the school milk at the prices set by School Dietary Supplement (Milk) Management Sub-Committee (the prices cannot be higher than standard prices set by Dairy Cow and Product Committee or the Cabinet) from the 1st semester in 2010 onwards. The prices are as follows:

Pasteurized milk	6.06	baht	per bag
UHT milk	7.30	baht	per carton
	7.20	baht	per bag

In the 2nd semester in 2009, School Dietary Supplement (Milk) Management Sub-Committee passed a resolution asking the private schools to buy all UHT milk to solve the problem of UHT milk processed by the entrepreneurs who purchased surplus raw milk. In the 2nd semester in 2009, the entrepreneurs agreed to sell UHT milk at 7.00 baht per bag.



RESEARCH

School Feeding in APEC Economies

APEC Subcommittee on Standards and
Conformance

July 2012

APEC Project CTI 24/2011A

Produced by
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Social and Industrial Food Service Institute, Russia

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TABLE OF CONTENT

1. INTRODUCTION

- 1.1. Subject history
- 1.2. Research and methodology

2. GENERAL ISSUES RELATED TO APEC ECONOMIES DEVELOPMENT

3. APEC ECONOMIES SCHOOL FEEDING REVIEWS

- 3.1. Australia
- 3.2. Brunei Darussalam
- 3.3. Canada
- 3.4. Chile
- 3.5. China
- 3.6. Hong Kong, China
- 3.7. Indonesia
- 3.8. Japan
- 3.9. Korea
- 3.10. Malaysia
- 3.11. Mexico
- 3.12. New Zealand
- 3.13. Papua New Guinea
- 3.14. Peru
- 3.15. Philippines
- 3.16. Russian Federation
- 3.17. Singapore
- 3.18. Chinese Taipei
- 3.19. Thailand
- 3.20. US
- 3.21. Viet Nam

4. CONCLUSIONS AND RECOMMENDATIONS

5. REFERENCES

6. APPENDICES

1. INTRODUCTION

1.1. Subject History

The preparation of the APEC economies school feeding system research conducted on the basis of certain open sources materials is aimed at initiating a dialogue related to such important issues as human development, poverty and inequality combating, national and collective food security. This paper authors were subject to certain restrictions while acquiring necessary unified information in the sphere of school feeding in all the APEC economies. They hope to partly bridge this gap during the seminar as well as to receive some additional data from its participants soon after the exchange of ideas is performed and the seminar finished.

The model for this material preparation was taken from the research conducted by the Global Child Nutrition Foundation in 2009¹. This research points out the fact that the global food, fuel and financial crises have given new prominence to school feeding as a safety net and social support program.

School feeding programs (SFP) continue their long established roles of increasing school attendance, reducing drop out rates and helping children learn while improving child nutrition. The data available today suggests that all countries, as perhaps never before in history, provide food in some way and at some scale to school children

School feeding is most likely to be an effective and sustainable intervention when it becomes a national program that is mainstreamed in the country's policies and plans. Several countries have made the transition to nationally-owned and operated programs; others are now starting the process. Past experience shows that policy development, with supportive funding, is a long, multi-year process.

One of the global challenges is to provide information and guidance that will help expedite the transition process. Although each economy needs vary widely, there is consistent information available from countries operating national programs that could help guide other countries in the beginning phases of this transition process.

This review is the first attempt to collect and interpret relevant data on school feeding in APEC region with an aim to establish a mechanism leading to a more reliable information support of mutual actions in school and social feeding.

1.2. Research and Methodology

With an overall objective of collecting and reporting accurate information on the school feeding systems in APEC economies and funding from each of the countries, the following steps guided the information gathering and processing process:

1. Update existing data bases created at the Social and Industrial Food Service Institute.
2. Undertake the search for relevant data through Internet.
3. Compile all information into a draft report.
4. Develop a questionnaire² and a letter with a request for information (national reports on school feeding) to be sent to persons in charge in school feeding in selected APEC economies.
5. Organize the Seminar with economies presentations
6. Summarize the results, interpret, and report findings a final review.

¹ Country Policy and Funding Mechanism Study. November 2009. Prepared by the Global Child Nutrition Foundation. www.gcnf.org

² "SABER- School Feeding Data Collection For School Feeding". The World Bank. Human Development Network. July 2011.

The following subject areas were selected:

1. School feeding program background.
2. Transition to national program.
3. Institutional framework.
4. Policy framework.
5. Program design.
6. Food procurement.
7. Community participation and ownership.
8. Program funding.

Within each thematic subsection, detailed questions were then included. By doing so, it was hoped that a more in-depth, three-dimensional understanding would be gained.

The review consists of three main parts.

The first part deals with general issues of economics, poverty, food security and school feeding in the APEC region.

The second one devotes to descriptions of school feeding systems in the APEC economies. To the extent possible, these descriptions were structured to reflect the above mentioned subject areas. The goal was to present all APEC economies. In case when no available information on APEC economy was found, the APEC economy description was marked as N.A. In some cases the APEC economy descriptions in this draft review represent the texts taken from previously published reports, studies, manuals, etc. meaning that they will be replaced at a later stage.

The third part represents the main findings and recommendations for following joint actions.

APEC economy references are collected in Section 5.

In Annex (Section 6) an example of the questionnaire for APEC economy interviews is given.

2. GENERAL ISSUES RELATED TO APEC ECONOMIES DEVELOPMENT

The “Asian-Pacific Economic Cooperation” (APEC) forum established in 1989 includes 21 members jointly representing 54.9% of the global GDP, 47.1% of the international trade in goods and services, 44.5% of the total world accumulated direct foreign investments and 39.9% of the global population³. The main macroeconomic indicators of the APEC economies are given in Table 1.

As all other economies, the APEC economies suffered a considerable damage as a result of the world economic, financial and food crisis.

The food security issue still remains burning and topical, especially after this indicator drastic decrease in 2006-2008. The food price growth that mainly affected the most vulnerable social groups, the essentially increased amount of undernourished people imperiled the implementation of the UN Millennium Declaration objective, i.e. to bring down the share of undernourished people in two by 2015. At the moment a quarter of these people live in the APEC region.

According to experts, the main trends of the global food sphere include the following⁴:

- a high level and volatility of food products prices, as a result of which two billions of the poorest world population have to spend 50-70% of its income on food;

³ APEC: reference information. Russian APEC Study Centre. http://www.apec-center.ru/contribs/filemanager/connectors/html/filemanager.html?virt_name=/APEC_broshura.pdf

⁴ Round table “Food Security in the APEC Region – Potential Initiatives of Russia in 2012”. <http://www.apec-center.ru/trends/36/114/show/>

- acceleration of the food products demand growth in such economies as China, Thailand, Malaysia, where economic achievements and growth of the population amount and income establish new food needs;
- expansion of areas meant for planting those crops used for biological fuel production, which resulted into the oil price affecting the bread price, i.e. the more expensive oil is, the more profitable it is to produce biological fuel instead of food products;
- a continuous growth of famine in the world and the increase of undernourished people, i.e. for the last 5 years their amount stepped up by almost 70 million people.

Table 1

APEC Economies development

Member Economy and Year Joined	Population (thousands)	GDP (US\$ mln)	GDP per capita (US\$)	Imports of Merchandise Goods and Commercial Services (US\$m)	Exports of Merchandise Goods and Commercial Services (US\$m)
Australia (1989)	22,328.8	* 1,238	* 55,150	251,857.8	259,786.6
Brunei Darussalam (1989)	398.9	* 12.4	* 29,675	2,950.0	9,200.0
Canada (1989)	34,108.7	1,574,052.2	46,148.0	492,242.6	455,450.1
Chile (1994)	17,113.6	203,442.6	11,887.7	70,524.0	81,713.7
China (1991)	1,338,299.5	5,878,629.2	4,392.6	1,587,272.6	1,748,072.3
Hong Kong, China (1991)	7,067.8	224,457.8	31,757.8	492,902.8	507,449.8
Indonesia (1989)	239,870.9	706,558.2	2,945.6	157,527.0	174,051.7
Japan (1989)	127,450.4	5,497,812.5	43,136.8	849,851.3	908,713.9
Korea (1989)	48,875.0	1,014,483.1	20,756.6	518,189.6	547,953.3
Malaysia (1989)	28,401.0	237,803.8	8,373.0	196,705.7	231,479.6
Mexico (1993)	113,423.0	1,039,661.5	9,166.2	332,893.1	313,738.9
New Zealand (1989)	4,367.8	* 140.5	* 32,163.0	39,637.6	39,990.7
Papua New Guinea (1993)	6,858.2	9,480.0	1,382.3	7,245.0	5,863.6
Peru (1998)	29,076.5	153,844.9	5,291.0	35,920.6	39,400.2
Philippines (1989)	93,260.8	199,589.4	2,140.1	69,294.6	64,739.0
Russia (1998)	141,750.0	1,479,819.3	10,439.6	318,960.8	444,093.4
Singapore (1989)	5,076.7	222,699.1	43,866.9	406,895.9	463,778.7
Chinese Taipei (1991)	23,140.9	430,096.0	18,588.0	288,333.4	314,782.6

Thailand (1989)	69,122.2	318,847.0	4,612.8	228,000.9	229,125.1
United States (1989)	309,050.8	14,582,400.0	47,184.4	2,327,257.5	1,796,597.9
Viet Nam (1998)	86,936.4	103,571.7	1,191.3	94,572.0	79,546.7

Source: StataAPEC <http://statistics.apec.org/>

Extracted 3 Jan

2012

* Data from Economic Fact Sheets – <http://dfat.gov.au/geo/fs>

* GDP (US\$bn) (current prices) and GDP per capita (US\$)

* GDP per capita (US\$)

Processes of ensuring global, regional and national food security are established under the influence of two most important directions of the economic policy.

On the one hand, it implies a necessity to liberalize economic relations, especially those in the commercial sphere, on the other hand, to implement a policy of supporting national product manufactures and people's buying capacity, especially that of low-income groups.

The differentiation of the governmental support levels is extremely high and reflects both objective differences of agricultural manufacturing and financial possibilities of each APEC economy. For example, the level of agricultural manufacturing governmental support in New Zealand is under 1% of the sold products cost, in Australia – 4%, in Russia – 11%, in Japan – 47%. In this case, an important function is performed by those terms and restrictions introduced within the WTO framework. The trend implies the fact that in most economies the emphasis is shifted from direct support of agricultural manufacturers to a high-level support of vulnerable social groups⁵.

Food product turnover management is regarded as one of the key issues for the APEC economies. The efficient system for such management implementation is created in Australia and New Zealand.

The basis for the APEC economies cooperation in respect of issues related to school systems functioning can be provided by the following priority activity directions:

- sustainable market architecture establishment;
- innovative development of agricultural manufacturing, including biological technologies and other innovative aspects, planning and risk assessment;
- improvement of food products quality and security by all aspects;
- food provision to vulnerable social groups.

According to experts, the new APEC food market environment calls for new rules development, including the international trade regulations and buffer reserves creation (regional, interregional and domestic ones). Currently the rice reserve fund is already established by Japan, Korea and China. The agreement was also concluded within the ASEAN framework implying a new reserve fund creation in the amount of 790 thousand tons of corn.

Food reserves creation affects food security as well as the price volatility level. The factors determining the world food prices growth⁶ include shortage of resources for food products manufacturing (building a supply) and demand increase. In this case, the volume of food products manufactures is decreasing, while the food demand is still growing. It is a new long-term trend of the world food market.

⁵ It is worth mentioning that for the period 1995-2005 from all “green box” funds provided by the USA to support its agriculture, the expenditures for direct food aid to poor population amounted in average to \$38.3 billion. The total of all other measures did not exceed \$17.2 billion per year. In the budget of the US Ministry of Agriculture for the period 2010-2012 these programs are funded by more than \$94, 1 billion, \$104.9 billion and \$111.9 billion respectively. From 1995 to 2001 the “green basket” expenditures increased by 56% in the EU, by 26% in the USA and by 53% in Australia.

⁶ <http://www.apec-center.ru/trends/36/389/show/>

The food crisis of 2007-2008 and financial and economic crisis of 2007-2009 affect the most vulnerable social groups. According to FAO, as a result in 2009 the amount of undernourished people stepped up by some 200 million people against the corresponding amount in 2000 and exceeded 1 billion people. In this case, the most part of undernourished people (642 million people) live in the Asian-Pacific region⁷.

The growth of food prices led to the efficiency growth of those investments poured into the agricultural sector. It accounts for the increase of agricultural projects financing both by private sector and international financial organizations.

Within the framework of food security enhancement issue discussion and its current APEC presidency, Russia plans to hold negotiations and work out proposals for the following main directions⁸:

- sustainable growth of agriculture, providing an emphasis upon the investments increase and expeditious introduction of innovations;

- further establishment and development of markets, including monitoring and data exchange in respect of production volumes, supply and demand; easing of food prices volatility; market infrastructure development; decrease of losses within the whole food chain, i.e. production, storage, transportation, processing and distribution;

- innovative agriculture development, in particular, by means of joint elaboration and introduction of new technologies and creation of the system for technologies and knowledge transfer;

- improvement of food products quality and security;

- food provision to vulnerable social groups;

- marine ecosystems maintenance as well as combating illegal fishing and world ocean biotrade.

As a large regional structure, APEC will continue to play an important role in improving regional and global food security by supporting sustainable development in the agricultural sector⁹.

School feeding is referred to specially considered issues. It implies problems of education, health, social security, poverty and inequality combating. School feeding is more frequently regarded as an economic development tool as it requires consideration of those capacities provided by interconnected branches of agriculture, food and processing industries, commodity distribution network and other infrastructural complexes.

The importance of school feeding development is understood both by developed and developing economies that still possess certain food security problems or have reached a high level of food provision. One can observe improvement of institutional environment and normative basis, enhancement of financial and organizational activity grounds of this specific economic sphere.

The level of school feeding systems development in the APEC region as of 2009 is provided in Table 2¹⁰.

⁷ http://www.fao.org/fileadmin/user_upload/newsroom/docs/russian_figs.pdf

⁸ <http://www.apec-center.ru/trends/36/481/show/>

⁹ APEC Outcomes&Outlook 2011-2012.

¹⁰ http://www.schoolsandhealth.org/general%20documents/country_level_school_feeding_programmes_sources.pdf

Table 2

The level of school feeding systems development in the APEC region

APEC economy name	APEC economy code	Category	Source
Australia	AUS	1	Australian Red Cross (2008).
Brunei Darussalam	BD	no data	
Canada	CDA	1	Canadian Association for School Health (2008).
Chile	CHL	1	WFP (2008).
Peopple's Republic of China	PRC	2	Ji, C. (2006). The Progress of School Feeding Service in China. International School Feeding Meeting. http://www.mineducacion.gov.co/1621/articles-110895_archivo_pdf4.pdf
Hong Kong, China	HKC	no data	
Indonesia	INA	3	WFP (2007). Standard Project Report.
Japan	JPN	1	Telegraph (2005). http://www.telegraph.co.uk/education/main.jhtml;sessionid=FLOX00ACRHX1QFIQMFSM54AVCBQ0JVC?xml=/education/2005/03/11/tefoliver091.xml&sSheet=/education/2005/03/11/ixteleft.html
Republik of Korea	ROK	1	BBC News (2005). School dinners around the world. http://news.bbc.co.uk/1/hi/education/4298245.stm
Malaysia	MAS	2	Rotary Club of Gombak (2008). School Feeding Programme for Needy Children. http://rotarygombak.org/feeding-programme/
Mexico	MEX	1	LA-RAE (2007).; WFP (2008).
New Zealand	NZ	1	BBC News (2005). School dinners around the world. http://news.bbc.co.uk/1/hi/education/4298245.stm
Papua New Guinea	PNG		
Peru	PE	2	WFP (2007). Standard Project Report.
The Republic of the Philippines	RP	3	WFP (2007). Standard Project Report.
Russia	RUS	1	WFP (2007). Standard Project Report.
Singapore	SIN	1	http://www.moe.gov.sg/media/speeches/2001/sp09012001.htm
Thailand	THA	2	Jumpatong, D. (2006). School Lunch Program and Rice Consumption Behavior in Thailand. Ministry of Education. http://worldfood.apionet.or.jp/thai.pdf
United States	USA	1	United States Department of Agriculture Food and Nutrition Service (2008). School Meals. http://www.fns.usda.gov/cnd/
Viet Nam	VN	2	Hall, A., T. T. M. Hanh, et al. (2007). "An evaluation of the impact of a school nutrition programme in Viet Nam." Public Health Nutrition 10: 819-826

Category 1: Countries where food is available in most schools, sometimes or always with subsidies for some or all children

Category 2: Countries where food is available in most schools some of the time

Category 3: Countries where school feeding is available primarily in the most food insecure regions

Below one can observe some preliminary materials characterizing school feeding development in certain APEC economies.

3. APEC ECONOMIS SCHOOL FEEDING REVIEWS

3.1. AUSTRALIA

3.1.1. School Feeding System Description

Australia consists of four states and two territories. The territories fall within the jurisdiction of the federal government while the states are free to make their own decisions in the internal policy sphere, including those issues related to development and implementation of school feeding programs (SFPs). For example, the SFP managed by the federal government through the Department of Education and Labour Relations cover all schoolchildren of the Northern territory providing food to 8,000 students of 71 schools. (50)¹¹ Under this program, students are provided with lunch while breakfast is often ensured by other organizations, for example, by the Australian Red Cross. In case a student is absent from classes, their parents or guardians can fetch this student's meal to their place. (47)

SFPs creation for supporting children from low-income regions still remains one of the main directions of charity organizations activity. It is noteworthy that the conducted programs are relevant for primary and high school students. (17, 19)

As a rule, SFPs in Australia imply only breakfast provision to students (excluding federal SFPs for the territories, due to which students receive their lunch meals). (38)

3.1.2. Program Development

SFPs are managed by states governments. The Department of Education and Labour Relations deals with implementation of federal SFPs for the territories. (47)

School breakfasts programs have been valid in Australia since the end of the 1970s. However, they are financed not by the federal government but by local and national non-governmental organizations. Besides, schools receive funds for SFPs implementation by means of subsidies provided by business structures and fundraising activities arranged within various events. As a rule, a school contacts a non-governmental organization and fills in a form for financial support acquisition. A non-governmental organization sponsors SFP offering recommendations related to the program development and implementation. It is assumed that in a while schools will be able to raise necessary funds to implement SFPs on an independent basis.

On the whole, SFPs creation and operation vary on a regional basis, which reflects specific needs of involved schools. (38)

The Australian Red Cross as well as "Foodbank WA" charity organization also take part in SFPs implementation. The Australian Red Cross SFP is regarded as nationwide program providing 800,000 breakfasts to 250 schools annually. (39) The "Foodbank WA" charity organization has been implementing its school breakfasts program since 2001. At the moment, the program involves over 360 schools. Due to this SFP, over 12,500 students are provided with food. (17)

3.1.3. Legislative Regulation

Currently, there are no unified national standards in the school feeding sphere in the country. There exist healthy nutrition recommendations for children and teenagers. In 1989, the Australian Nutrition Foundation issued recommendations for school canteens. These

¹¹ References are provided in the Appendix by countries.

recommendations were revised in 2000 for the purpose of determining what products would be available for children and teenagers.

Food products provided in school and preschool establishments should comply with the requirements of the Australian Guide to Healthy Eating. The Australian recommendations to healthy eating for children and teenagers serve as a framework for selecting healthy food products. The Australian Guide to Healthy Eating based on the Recommendations provisions offers certain specific advice related to the norm of healthy products consumption. (22)

The National Health and Medical Research Council by the Australian Healthcare Department revised the Australian recommendations to healthy eating. Instead of covering information related to necessary norms of nutrients consumption, a new edition emphasizes the fact how to select the right food products. (11)

The Australian recommendations to healthy eating for children and teenagers are regarded as the main document serving as a basis for the governments of the states and territories by SFPs management.

3.1.4. Food Supply Management

The decision related to managing a canteen or ordering meals from food suppliers is made by school councils.

The food supply chain can be illustrated by the “Metropolitan Canteens” example. This company operates in the sphere of public nutrition management administering school canteens of one hundred Australian schools. (31) One of the “Metropolitan Canteens” food suppliers (30) is represented by the “Lion Nathan National Foods” food company purchasing agricultural products from local farms and large cooperatives incorporating several farms. (28, 29) For example, the “Milkline” network includes dairy products suppliers (32) while the “Dairy Farmers Milk Cooperative” consists of separate farms and purchases dairy products in accordance with the delivery terms. (10)

“Foodbank” is a nonprofit charity organization dealing with distribution of agricultural products surplus for providing food support to those in need. There are the organization divisions in most Australian states, the most famous of which are represented by “Foodbank SA” (in South Australia) and “Foodbank WA” (in West Australia). The food suppliers include the “Coles” and “Woolworths” supermarket chains, the “Arnotts” company and other food companies. (16, 18) Under the school breakfasts program implemented by this charity organization, students are provided with nonperishable products, including canned fruit, biscuit, “Vegemite” paste, canned macaroni products, canned beans, UHT milk and oat flakes. If possible, fresh vegetables and fruit, milk, yogurts and bread are provided for breakfast. (17)

Schools can acquire fresh fruit and vegetables directly from local farms due to the “Food4Schools” initiative. The program is aimed at supporting agricultural manufacturers of South Australia. However, there are no legislative regulations adopted by the government in respect of purchasing food products from local producers. (15)

Rural school grounds creation is regarded as a possibility of acquiring fresh fruit and vegetable for the school breakfasts program. The “Kitchen Garden Program” implemented since 2001 is very wide-spread and operates at 259 primary schools of Australia. Students are provided with a unique possibility of first growing at the school ground and then preparing at the school kitchen delicious and healthy meals. (25, 26)

3.1.5. Local Engagement

School councils play an important role in SFPs implementation. It is the school councils that make a decision concerning canteens operation method in most schools.

There are several options of the canteen operation management:

1) payment for the manager's and personnel's work. The manager implements constant control over the canteen operation assigning various tasks to its personnel or volunteers;

2) partial payment of the manager's and volunteers' work. The manager visits the canteen in the morning in order to distribute volunteers' responsibilities and returns there in the afternoon in order to ensure the assigned work completion;

3) volunteers engagement. The canteen operates due to the voluntary manager and personnel involvement;

4) engagement of the company operating in the sphere of public feeding management. The canteen operation management is assigned to the company operating in the sphere of public feeding management that hires the canteen personnel by itself;

5) engagement of food suppliers. In the absence of their own canteen, schools can order food from independent suppliers.

By making a decision concerning canteens operation method, school councils should consider the required type of food provision. For example, primary schools can be restricted by volunteers' assistance and food suppliers engagement while secondary schools providing food to a considerable amount of students frequently need a separate manager for the canteen operation management. (9)

By SFPs implementation for the Northern territory students, a special emphasis should be put on local engagement. It is noteworthy that SFPs implementers should manage to engage parents and school personnel into the SFP implementation process sharing their knowledge and skills in the sphere of feeding and food preparation. On the whole, parents and school personnel voluntary engagement into the process of SFPs implementation is highly encouraged and appreciated. (46)

Students' parents do not take part in the process of SFPs planning and assessment. SFPs efficiency assessment is performed by specialized audit agencies. SFPs audit in the Northern territory is conducted by the Department of Finances and Deregulation. (36)

3.1.6. Financing

The Australian federal government allocates funds for providing technical assistance to local and regional authorities in the sphere of feeding improvement. In particular, \$12,800,000 was allocated in 2008-2012 for creating production and technical facilities at 190 Australian schools for the purpose of implementing the National Rural School Grounds Program. (27)

The Australian federal government provides financial support and tax benefits to low-income families assisting with payment for their children's education. (48). According to the federal government forecasts, this education tax benefit will help 700,000 Australian families to cover the cost of their children's education. (24)

According to the "Foodbank" organization data, the cost of daily breakfast provision to one schoolchild makes up 42 cents, while the annual breakfast provision to all students of a particular school - \$5,000. (23). The average school lunch (a sandwich and fruit) costs some \$3. (49)

The Australian government allocated \$6,397,000 to the Department of Education and Labour Relations for SFPs implementation in 2007-2008 and \$7,449,000 in 2008-2009. According to the program terms, parents should pay for the food provided to their children.

The food price can vary on a regional basis but the average cost of providing breakfast and lunch to a student within the whole academic week makes up \$35. In some regions, the paid amount is less due to the fact that schoolchildren are provided only with lunch.

According to the Report on Audit and Financial Control, the existing financing and control mechanisms used by the Department of Education and Labour Relations cannot ensure direct consistency between the amount of funds allocated by students' parents and those sums spent on schoolchildren's food by the federal SFP implementers. The research results testified to the difference of the requested amount. For example, the cost of weekly provision of breakfast

and lunch to one student varied from \$25 to \$35 at different schools. It is also pointed out that out of \$6,397,000 allocated for SFPs implementation in 2007-2008 only \$3,088,000 was spent. Therefore the underspent amount made up \$3,309,000 (51.7%).

SFPs audit in the Northern territory was conducted by the Department of Finances and Deregulation. (36)

The SFP cost is determined by the way of considering the SFP implementers' applications specifying the cost of the program performance and all possible expenses. In case the budget is underspent, implementers should contact a project manager of the Department of Education and Labour Relations so as the remaining funds should be spent on the program tasks fulfillment. (47)

3.2. BRUNEI DARUSSALAM

In Brunei the SFP development and implementation is carried out by the Ministry of Education. The first SFP was elaborated even in 1940. Within its framework, students of 11 schools were provided with food. The main program objective implied developing healthy eating habits among children.

Further, the government prepared various policies and acts. In 2000, recommendations in the sphere of people nutrition were elaborated.

The nutrition issues are determined as the main direction of the 1999 program implemented by the National Committee for Health Promotion. This program was recognized as the best one. Within the 1999 SFP, rice, vegetables, beans and pumpkin were provided.

The school menu in Brunei is made up with consideration of seasonal fluctuations and includes rice, fresh fish, fruit and vegetables.

Canned and frozen vegetables are imported from the USA, Europe and Australia, frozen meat and poultry – from Denmark, Australia, New Zealand and the USA. Fruit is regarded as a seasonal product. It is imported from Australia, New Zealand and the USA. Local fruits include bananas, papaya, pineapples and grapefruits. Implementation of national food security plans (covering education establishments) implies engagement of a number of establishments dealing with specific aspects of this problem (Table 3).

Table 3

Governmental establishments engaged in implementing the food security policy

Sphere	Establishment	Role	Comment
Legislative regulation	Healthcare department	Leading	1998 Healthcare Act and 2000 Public Feeding Act, 2003 Infectious Diseases Regulation
	Fisheries department	Leading	Fisheries Act (including fish processing regulations)
	Agriculture department	Agro-industrial food products	Agricultural Food Products Act (final phase)
	Municipal councils and local representative offices	Licensing organizations, including those meant for food products manufacturing	Law on Licensing
Research	Healthcare department	Physical, chemical and microbiological research in the food products sphere	
	Agriculture department		
	Fisheries department		

Monitoring	Healthcare department	Monitoring of imported products and internal production, legislative acts compliance control	
	Agriculture department	Audit of fish processing establishments, imported fish control (first of all, fresh fish), legislative acts compliance control	
	Fisheries department	Audit of domestic and imported food products, inspection	Import certification
Integral system establishment in the food security sphere	Healthcare department	Proper services, hygienic control	
	Agriculture department	Proper agricultural practice	
	Fisheries department	Food products quality control	
Inspection and certification	Healthcare department	Brunei Darussalam is undergoing food industry certification process. It is especially topical for those organizations that are potentially able to conduct operations abroad. The relevant policy is implemented by certain corresponding authorities.	
	Agriculture department		
	Fisheries department		
Educational activity	Healthcare department Agriculture department Fisheries department	In accordance with plans and programs	
Information and consulting activity			

3.3. CANADA

3.3.1. School Feeding Programs

Canada lacks a single federal SFP, so provinces develop their own programs in this sphere while territories implement corresponding projects by the federal government support. In particular, in North West Territories SFPs are financed due to the “Brighter Futures” program implemented by the Ministry of Healthcare of Canada. (12)

From the social point of view, the Canadian SFPs are mainly aimed at combating marginalization. For this reason, SFPs do not emphasize low-income social groups support, i.e. all students are engaged into the program while their parents make a required monetary contribution depending on their financial possibilities. However, in case parents cannot pay for their children’s meals, the latter are still provided with food. (4) It is also noteworthy that the School Lunch Association has been assisting with food provision to schoolchildren since 1989 being the largest sponsor of school lunches programs in Atlantic Canada.

According to the data collected by the “Breakfast for Learning » nonprofit organization, a third part of all primary schoolchildren in Canada remain hungry during the whole school day.

(4) This fact testifies to SFPs insufficient development in the Canadian schools. Besides, it is noteworthy that most SFPs account for primary, not secondary schools.

The “Community LINK” program (Learning Includes Nutrition and Knowledge) was initiated by the Ministry of Education in British Columbia for the purpose of providing assistance in low-income regions. In particular, in 27 out of 109 Vancouver schools there is a SFP funded by the province government, providing the Ministry of Education determines what schools should receive subsidies on the basis of social security index. Financing under the “Community LINK” program helps schools to provide students with SFPs (breakfasts and lunches) and conduct morale building activities for children and youth at risk. So vulnerable groups of children are supported for the purpose of increasing their academic performance and abilities for social interaction. (3)

As a rule, students have only one meal every school day. However, the meal time can significantly vary. On the whole, the breakfast menu is more or less the same at all schools.

3.3.2. Regulating and Coordinating Functions of Governmental Institutions

The Ministry of Healthcare performs the following functions required within the process of school feeding management:

- develops draft laws, establishes standards and provides necessary recommendations and information in the sphere of food security and nutrition value.
- provides health and well-being maintenance of the Canadian citizens by means of complex determination, development and introduction of draft laws and standards in the nutrition sphere on the basis of the existing data.
- enforces the «*Food and Drugs Act*» implementation in the sphere of public healthcare, food security and nutrition. (17)

The Ministry of Healthcare of Canada establishes legislative standards in the sphere of security and quality of those food products sold in Canada. The Ministry of Healthcare requirements compliance is monitored by the Canadian Food Inspection Agency. CFIA deals with introduction of standards and legislative regulations set by the Ministry of Healthcare of Canada in respect of food security. (17)

The scientists of the Ministry of Healthcare of Canada assess a threat to human health posed by food chemical contaminants.

3.3.3. Statutory Regulation

At the national level, the “*Food and Drugs Act*” provisions are valid.

One of the most important national regulatory documents is Canada’s Food Guide. Canada’s Food Guide serves as the basis for creation their own recommendations and legislative regulations in the food sphere in the Canadian provinces. For example, it is Canada’s Food Guide that provides foundations for the Guidelines for Food and Beverage Sales in British Columbia schools, according to which all food products are divided into four categories: “Choose most”, “Choose sometimes”, “Choose least”, “Not recommended”. These guidelines are binding, i.e. all schools should avoid selling food and beverages included into such categories as “Choose least” and “Not recommended”. (16)

Packing materials safety is checked in accordance with Section 23 of Food and Drugs Act and Regulations. Under Paragraph B.23.001 thereof, it is prohibited to sell food products, whose package can contaminate a product contained inside it. According to this law, a person dealing with food products sale (a producer, distributor, etc.) is responsible for non-compliance with this provision. Food supplements regulation in Canada is governed by Food and Drugs Regulations. (19)

On the level of provinces and territories, the following regulatory acts are valid (Table 4).

Table 4

Consolidated legal framework of school feeding

Jurisdiction (province/ territory)	Norms for territories/provinces Responsible structure	Law/recommendations essence
Alberta (province)	Nutrition recommendations for children and youth / Ministry of Healthcare	Recommendations refer to all regional zones related to children's studying or playing activities <ul style="list-style-type: none"> • In accordance with the recommendations of Canada's Food Guide (2007), all food products are divided into three categories depending on their nutritional parameters: "Choose most", "Choose sometimes" and "Choose least" • Primary schools serve only food products belonging to Category "Choose most" • 60% of food products served at junior secondary schools are referred to Category "Choose most", while 40% - to Category "Choose sometimes" • 50% of food products served in secondary schools are included into Category "Choose most", and 50% - into Category "Choose sometimes"
British Columbia (province)	Guidelines for Food and Beverage Sales in British Columbia (2007) Ministry of Education and Ministry of Healthcare	Regional recommendations are referred to all food products and beverages sold to students <ul style="list-style-type: none"> • In accordance with the recommendations of Canada's Food Guide (2007), all food products and beverages are divided into four categories depending on their nutritional parameters: "Choose most", "Choose sometimes", "Choose least" and "Not recommended" • At least 50% of food products and beverages being sold should belong to Category "Choose most" and about 50% can be referred to Category "Choose sometimes" • Food products and beverages included into such categories as "Not recommended" and "Choose least" should not be sold at schools
Quebec (province)	Healthy lifestyle in schools: Framework Legislation on Healthy Eating and Active Lifestyle (2007) Ministry of Education, Culture and Sports	Framework legislation for local schools councils, state and private preschool establishments, primary and secondary schools <ul style="list-style-type: none"> • The framework legislation implies three main directions of activity related to healthy eating on the basis of Canada's Food Guide (2007) and recommendations of the Canadian Dietetic Association both in respect of school feeding and beverage and food sale through school vending machines: <ol style="list-style-type: none"> 1) Diversify the food ration giving priority to high nutritional food products 2) Prohibit sale of low nutritional food products at

		<p>schools</p> <p>3) Ensure appropriate premises and conditions for food consumption at schools</p>
Manitoba (province)	Guidelines for Food Served at Schools in Manitoba province	<p>Regional recommendations are referred to food products sold or served at schools</p> <ul style="list-style-type: none"> • In accordance with the recommendations of Canada's Food Guide (1992), all food products are divided into three categories depending on their nutritional parameters: "Choose most", "Choose sometimes" (3-4 times per month) and "Choose least" (up to 1-2 times per month) • The Manitoba legislation requires that all schools should possess their own food strategies. Besides, school councils should check the fact that schools do not sell or serve food products containing transgenic fats
New Scotland (province)	<p>Food Legal Framework for Public Schools in New Scotland (2006)</p> <p>Ministry of Education and Ministry of Healthcare</p>	<p>The province legislation is regarded as binding and establishes standards for food products and beverages served and sold at public schools.</p> <ul style="list-style-type: none"> • In accordance with the recommendations of Canada's Food Guide (1992), all food products and beverages are divided into three categories: "Choose most" (can be sold or served at schools on a daily basis), "Choose sometimes" (can be served or sold at schools periodically, i.e. twice per week) and "Choose least" (can be served or sold at schools up to 1-2 times per month)
New Brunswick (province)	<p>Law 711 – Food Policy Improvement at Public Schools (2005)</p> <p>Ministry of Education</p>	<p>Regional recommendations are referred to food products sold or served at public schools. Local schools are obliged to develop their own strategies by complying with the regional legislation.</p> <ul style="list-style-type: none"> • In accordance with the recommendations of Canada's Food Guide (1992), all food products are divided into three categories depending on their nutritional parameters: "Choose most", "Choose sometimes" and "Choose least". Since September, 2007, products referred to Category "Choose least" cannot be sold or served at schools.
Newfoundland and Labrador (province)	<p>School Eating Guidelines for Managers and Suppliers (2006)</p> <p>Ministry of Education Ministry of Healthcare and Public Utilities</p>	<p>Regional recommendations serve as the basis for developing strategies related to selling and serving food products and beverages to students at schools</p> <ul style="list-style-type: none"> • In accordance with the recommendations of Canada's Food Guide (1992), all food products and beverages are divided into two categories: "Choose most" and "Choose sometimes".
Ontario (province)	Act 8 – Healthy Food for Healthy Schools	Act 8 amends Education Act for the purpose of: <ul style="list-style-type: none"> 1) granting necessary powers to the Ministry of

	(2008) Memorandum No 135: Healthy Food and Beverages in Vending Machines at Primary Schools (2004) Ministry of Education	Education for developing strategies, recommendations and regulatory measures in the sphere of food standards 2) making additional amendments aimed at managing transgenic fats content in food products and beverages sold in school canteens • Memorandum No 135 is an independent legislative initiative of the province defining recommended nutritional norms for food products and beverages sold through primary school vending machines
Prince Edward Island (province)	Draft law on School Healthy Eating (2003)	As a result of negotiations conducted by three regional school councils, healthy eating strategies were developed. Currently, these strategies are considered by all primary and interdistrict schools. The strategies comply with Canada's Food Guide (1992).
Saskatchewan (province)	Guidelines for School Feeding (2004) Working group of dieting experts in the sphere of public healthcare of Saskatchewan province	In fact, it is a basis for analyzing the existing school feeding systems and developing legislative measures • It serves as a reference guide for such food categories as "Choose most", "Choose sometimes" and "Choose least".
Nunavut (territory)	Laws are under development	The program basis specifies tasks enabling to achieve certain objectives in the sphere of food provision and public healthcare security by food safety maintenance. The objective directly related to SFP recommendations implies the following: "develop, introduce and monitor the consistent <i>strategy</i> implementation, compliance with standards and recommendations in the sphere of food products provided by the regional government under sponsored and licensed programs as well as <i>actions</i> performance aimed at supplying high nutritional food to program participants".
North West Territories (territory)	Regional laws are missing	In 2004, the Canadian Minister of Education met the heads of the academic councils for the purpose of assessing their progress in the sphere of legislative measures and recommendations development. As a result, the heads of the academic councils suggested the Ministry of Education should provide municipalities with information and all necessary tools for supporting the process of legislative norms creation.
Yukon (territory)	Laws are under development	The framework strategy draft is being developed, it should allow schools and school councils to elaborate their own programs.

Schools implement certain norms prohibiting students to bring particular products (5) that may provoke allergic reactions by schoolchildren.

3.3.4. SFP Financing

The average annual cost of the school breakfasts program in Canada makes up some 5,000 – 8,000 dollars (for 25 people) or 45,000 – 52,000 dollars (for 225 people). Funds are raised by governments of provinces and territories, nonprofit organizations, municipalities, local schools as well as students' parents.

Table 5 provides the SFP cost structure by the example of Toronto.

Table 5

SFP cost

	Average cost of one meal	Amount of students	Total food cost (per year)	Cleaning expenses	Personnel maintenance expenses	Total program cost (per year)
Breakfast (one class)	1.02\$	25	4462.50\$	100.00\$	1500.00\$	6062.50\$
Breakfast (several classes)	1.02\$	225	40162.50\$	600.00\$	7250.00\$	48012.50\$

According to the established rules, 70% of the total program cost should account for food products purchase, while other expenses should not exceed 30%. (15, 29)

“The School Lunch Association” deals with fundraising for SFP financing on a local level. Parents and guardians provide the most extensive support for this SFP implementation covering 45% of its total cost. The remaining 43% can be obtained due to natural and legal persons' activity as well as by means of fundraising.

The volume of SFP state (regional) budget support is given in Table 6.

Table 6

SFP financing

Jurisdiction (province/territory)	Volumes of financial investments	Notes
Alberta (province)	---	The long-term financial support program is missing.
British Columbia (province)	14,000,000\$	The Community LINK initiative sponsored by the Ministry of Children and Family Development enables to support municipal school programs in the total amount of 45.5 million \$, providing that 14 million \$ accounts for SFP.
Quebec (province)	2,000,000\$	Since 2005, the province government has been allocating 2 million \$ to the “Club des petits déjeuners du Québec” organization on an annual basis.
Manitoba (province)	100,000\$	The province government allocates 100,000\$ for SFPs support on an annual basis.
New Scotland (province)	The total amount makes up 1,000,000\$. 750,000\$ is allocated for the school breakfasts program support.	Financing is provided by the Ministry of Education and Ministry of Healthcare.

	250,000\$ is provided for introducing measures related to school feeding management in New Scotland schools.	
New Brunswick (province)	1,250,000\$	The “Healthy Minds” program implemented by the Ministry of Education supports SFPs at primary schools. The “Fruit and Vegetable Program” developed specially for primary schoolchildren is funded by the Ministry of Culture and Sports.
Newfoundland and Labrador (province)	1,250,000\$	The program of SFP governmental financing is managed by “Kids eat smart foundation”.
Ontario (province)	17,000,000\$	The Ministry of Children and Youth Services allocates 17 million \$ for regional SFP support on an annual basis.
Prince Edward Island (province)	325,000\$	The Ministry of Education allocates 25,000\$ for salaries to school breakfasts programs coordinators on an annual basis. The Ministry of Healthcare provided 200,000 dollars to “PEI Healthy Eating Alliance” within the period from 2009 to 2011 for the purpose of developing and introducing measures related to school feeding management and 100,000\$ for the purpose of developing and supporting school breakfasts programs.
Saskatchewan (province)	2,000,000\$	The Ministry of Education allocates 500,000\$ for SFPs. The total amount of governmental investments makes up 2 million \$.
Nunavut (territory)	4,300,000\$	The financing volumes were increased in Toronto in order to efficiently respond to the food price growth and assist SFPs with employment of those resources provided by the province government. Considering the current situation, the former investment volumes would have covered only 15% of all programs cost.
North West Territories (territory)	0\$	SFPs are funded due to the “Brighter Futures” program implemented by the Ministry of Healthcare of Canada.
Yukon (territory)	0\$	SFPs are funded due to the “Brighter Futures” program implemented by the Ministry of Healthcare of Canada.
	42,000\$	The Ministry of Healthcare and Social Development provides an annual grant to the “Yukon Food for Learning” organization for food deliveries.
	39,000,000\$ According to the “Breakfast for learning” organization, only 7-10% of 5.2 million Canadian	The average indicator of governmental investments into students’ feeding makes up 0.04\$ per day.

	students receive at least partially subsidized school food.	
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3.3.5. Engagement of Business Structures and Local Farms

In most cases, food products are delivered to schools from central plants. However, there exist other programs, including the “Farm to School” movement and “Lunch Lady » franchise.

The “Farm to School” movement is aimed at establishing a direct tie between local farms and schools. (13) “Lunch Lady” has been dealing with preparing and delivering hot meals to Canadian schools since 1995. The network of franchised plants allows satisfying consumers’ needs in a more extensive way. The organization is eager to diversify the provided menu, complies with all local norms and provides food security (in particular, it carefully monitors that all dishes served to students should be hypoallergenic). (22)

The Community-Supported Agriculture (CSA) programs have spread over Canada. They represent a mutual agreement between farms and a set of consumers. Therefore, a direct access of people to food sources is ensured, which provides them with the freshest products, and farmers – with a regular income source. (11) In particular, this program is implemented by the “Fresh Roots Urban Farm”, whose distinctive feature is represented by a set of partnership agreements concluded with local Vancouver schools for the purpose of school grounds establishment. (33)

3.3.6. Volunteers

Most SFPs in Canada are coordinated on a volunteer basis by school personnel, community members, students and their parents. Volunteers deal with the following tasks: SFP menu compilation, food purchase, food preparation and distribution, cleaning before and after a meal. Volunteers are supported by dieticians, who instruct them how to make up a menu, inform about food security requirements and measures for healthy eating habits maintenance. The “Breakfast for learning” organization as well as other sponsors provide all means for SFPs coordinators compensation. (21)

3.4. CHILI

The school feeding system in Chili is described on the basis of the review on the status and issues of SFPs in Chili¹². The material will be specified upon the Seminar results.

3.4.1. Introduction

Child nutrition programs in Chile, which are administered by the government and implemented by private contractors, are among the most renowned in the world.¹³ Serving over 2.2 million meals a day to 1.8 million school aged students in 9,800 schools across the country, Chile’s child nutrition programs have played a major role in improving the nutrition of the nation’s children and increasing Chile’s school participation rate to nearly 100 percent, while dramatically reducing incidences of malnutrition^{14, 15}

¹² Yoko Kanemasu. Thailand. A desk review of the school feeding programmes, July 2007. WFP. <http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp207425.pdf>

¹³ Among its honors, the school feeding program in Chile was recognized by the United Nations World Food Program as one of the top five in the world. Source: “JUNAEB Background.” Gobierno de Chile JUNAEB website. Accessed in Google translation at http://74.125.91.132/translate_c?hl=en&ie=UTF-8&sl=es&tl=en&u=http://www.junaeb.cl/mundo/resena_historica.htm&rurl=translate.google.com&usg=ALkJrhil1dF1X7FcLbMYz2IM1n0c_vVRgw on May 15, 2009.

¹⁴ Sources: “Balance Internal Management: Year 2007.” National Board of School Assistance and Scholarships. Santiago, Chile.

In addition to nutrition programs for school aged children, the government of Chile provides specially designed nutrition programs for infants and toddlers in the nation's 3,340 government run free child care centers.¹⁶ Strong and consistent government support as well as innovative public-private partnerships have been driving forces in the programs' success.

3.4.2. Operators' Mission

While both The National Board of School Assistance and Scholarships (La Junta Nacional de Auxilio Escolar y Becas), or JUNAEB and The National Board of Day Care and Kindergartens (La Junta Nacional de Jardines Infantiles), or JUNJI operate large-scale child nutrition programs, neither of their missions is focused on feeding children. Rather, their missions are focused on providing vulnerable children the tools they need to be successful in Chile's education system. JUNAEB's stated mission is "to facilitate the incorporation, retention, and success in the educational system of children and young people living in social, economic, or psychological disadvantage by delivering quality services that contribute to equality of opportunity in the educational process"¹⁷

To carry out its mission, JUNAEB maintains a three pronged approach to assisting target students that focuses on the following areas: school meals, health, and scholarships. JUNAEB runs a scholarship program at the primary and secondary levels to help meet needs associated with the cost of school. At the University level, JUNAEB provides eligible university students with food voucher scholarships (20 a month, \$2 per voucher) that may be redeemed for lunch at participating restaurants on school days. JUNAEB's annual operating budget for these programs is \$640 million USD, including scholarships and health programming; \$430 million USD of those funds are designated for school meals for primary and secondary school students.¹⁸

JUNJI's mission, which has a similar focus on equity, is "to provide early education to boys and girls under four years of age who live in a situation of vulnerability and guarantee them equal development opportunities through the creation, supervision, and certification of day care centers and preschools either directly or through third parties."¹⁹

JUNJI has expanded significantly since 2006 when President Michelle Bachelet took office and called for a rapid and wide-scale expansion of the programs to reach more families who may benefit from the services. In 2005 there were 708 JUNJI centers in the country. Between 2006 and 2007, Chile extended its day care coverage by 240%, building 1700 new child care centers in the country over the two years. By 2010, it is projected that 3,500 new public and free day care centers will have been built that will educate 70,000 vulnerable infants in the country's poorest 40% of families.²⁰ In addition to government run JUNJI centers, a private nonprofit offers the same service of free child care and school meals for infants and toddlers.

3.4.3. Targeting of students to participate in assistance programs

While the child nutrition programs of JUNAEB and JUNJI together reach over two million children a day, neither of the programs are universal, nor are they intended to be. Rather, food in the JUNAEB and JUNJI programs is considered "a benefit that allows vulnerable

¹⁵ Ramón Solís Cácares, Chief of the School Feeding Department (Jefe Departamento Alimentación Escolar Dirección Nacional) of JUNAEB. Personal Interview. April 20, 2009.

¹⁶ Figure as of the end of 2008. "¿Qué Es La JUNJI?" JUNJI publication.

¹⁷ "Balance Internal Management: Year 2007." National Board of School Assistance and Scholarships. Santiago, Chile.

¹⁸ Ramón Solís Cácares, Chief of the School Feeding Department (Jefe Departamento Alimentación Escolar Dirección Nacional) of JUNAEB. Personal Interview. April 20, 2009.

¹⁹ JUNJI History

²⁰ JUNJI History

children to have equal opportunities in the education system.”²¹ With a few exceptions, such as very rural schools where meals are provided for all students regardless of income, JUNAEB and JUNJI programs target vulnerable students to ensure they have equal opportunities. For JUNAEB, this targeting assessment determines participation in school meals, health, and scholarship programs; for JUNJI, the targeting assessment determines whether infants and toddlers are eligible to participate in the JUNJI centers at all.

Unlike the United States, where the burden for applying for government child nutrition programs falls on vulnerable families, Chile has developed a system to determine eligibility using data that the government already collects. This comprehensive analysis of the families’ situation takes into account not only yearly or monthly income, but also stability or seasonality of income and level of education of the parents. This data is analyzed according to the National System of Allocation to Equity (SINA) using data from the Ministry of Planning (MIDEPLAN).

3.4.4. Public-Private Partnerships

At its inception, the school feeding programs in Chile were operated entirely by government agencies—JUNAEB and JUNJI—from administration, to the hiring and training of cooks, to the serving of meals. As the programs and institutions grew, a decision was made to begin to contract with private companies to provide school food service, with JUNAEB as the administering agency. In 1976, JUNAEB began a pilot program outsourcing some of its schools to private contractors. JUNAEB determined that these pilots were successful, and by 1980 all of the schools food service had been turned over to private companies. Most of the JUNAEB food preparation staff were hired by the private companies as they took over a school’s food service. Both the private sector implementing companies and JUNAEB maintain that since that time the government of Chile has maintained good public-private partnerships.^{22, 23}

On the public side of the partnership, JUNAEB and JUNJI set and control nutrition standards for their programs, including number of calories per meal, quantity of protein, quantity of fruits and vegetables, and requirements for variety. Based on these sets of criteria, private contractors submit proposals to service the school food for one of approximately ninety “Territorial Areas” or TUs. Each year JUNAEB accepts proposals to provide meals for 1/3 of the contracts in the country, so contracts are renewed or reallocated on a three year cycle. While JUNAEB and JUNJI are separate agencies, JUNAEB evaluates the bids for contracts for JUNJI to streamline the system. For each cycle, JUNAEB receives over 100,000 proposals (a single company will often write multiple proposals to service different areas).²⁴

Proposals are assessed based on a variety of factors in two major categories—quality and price. In the quality category, firms declare how they will satisfy JUNAEB’s requirements, including:

- Nutritional requirements for the different meals;
- Food structure for the various meals (breakfast, lunch, tea, and supper) and the frequency (or minimum and maximum presence) of certain foods, and the minimum variety required in the meals provided;
- Minimum quality characteristics of the inputs;
- Operating conditions, such as hygienic standards, supplies, food-handling practices, and supervision; and,

²¹ Ramón Solís Cácares, Chief of the School Feeding Department (Jefe Departamento Alimentación Escolar Dirección Nacional) of JUNAEB. Personal Interview. April 20, 2009.

²² Ramón Solís Cácares, Chief of the School Feeding Department (Jefe Departamento Alimentación Escolar Dirección Nacional) of JUNAEB. Personal Interview. April 20, 2009.

²³ Pablo Maturana. Co-owner of Santa Cecilia school food service company. Personal Interview. April 15, 2009.

²⁴ Ramón Solís Cácares, Chief of the School Feeding Department (Jefe Departamento Alimentación Escolar Dirección Nacional) of JUNAEB. Personal Interview. April 20, 2009.

- Infrastructure, such as furniture, equipment, and cockery.²⁵

Each proposal includes a plan for quality assurance, including how they will control the everyday personnel and management quality. Firms that meet these quality criteria then enter the second round of assessment based on a series of prices vendors must supply for a variety of meals, such as 350 calorie breakfasts for primary school students and 1000 calorie lunches for secondary school students. Because JUNAEB manages the proposals for all three programs—JUNAEB, JUNJI, and INTEGRA—and because nutrition requirements of the children vary with age and special needs, vendors must submit bids for 30 meal types.

In addition to variety of meal types, vendors are asked to submit bids for varying numbers of meals (80-100% of estimated meals in bid, 60-80%, and less than 60%) since the number of students participating may change. If the number of meals is far under the estimated proposed, the price per meal may increase slightly. Conversely, if the number of meals is more than 100% of anticipated, a company may receive slightly less per meal. It is from these numbers that companies that meet all quality standards can be selected to win a bid. While JUNAEB seeks to provide the maximum number of high quality meals at the lowest cost, they set a minimum price per meal each year to eliminate unrealistically low bids that may have underestimated costs and could result in either poor quality food or the company going bankrupt.

Once winning companies have been selected and begin to serve meals, they receive an agreed upon price *per meal* served. The government does not set prices for how much companies pay for food, nor do they set the price companies are paid per meal. Thus, the amount companies are paid per meal may vary from company to company and bid to bid. At the time of this study, April 2009, JUNAEB paid approximately \$1.13 per student per day for breakfast and lunch, with some variation by region and method of preparation. Since they are paid *per meal* served to an eligible student, school food service providers are responsible for providing JUNAEB with documentation of the number of meals served. In each school both a staff member from the private contractor and a designated teacher from the school record daily meal participation and ensure that the correct students receive meals. At the end of each month, JUNAEB pays the private contractors for the number of meals served in the previous month.

3.4.5. Computerized System for Proposal Evaluation

To ensure that the bid selection process is fair and cost effective, in 1997, then head of JUNAEB Lysette Henriquez requested that researchers at the Industrial Engineering Department of the University of Chile develop a system to improve the auction process. This team of researchers developed a combinational auction computerized system to evaluate school feeding proposals, a system JUNAEB began using in 1999. Whereas in a non-combinational auction, bidders bid on one item or one group of items with a single value, in a combinatorial auction, bidders can place bids on combinations of possibilities. In the case of JUNAEB's combinational auction, bidders are first filtered through based on meeting minimal quality criteria, and then their bids are assessed using the combinational auction system, which evaluates the bids on various food packages and quantities of food packages.

The JUNAEB combinatorial auction system is internationally renowned and was the recipient of the 2002 International Federation of Operational Research Societies Prize for Operational Research in Development, awarded to the best application of Operational Research in a developing country.²⁶ The combinational auction process is cited as being more transparent and less subject to bidders "exert[ing] inappropriate pressures on the officials administering the

²⁵ Epstein, Rafael et al. "A Combinational Auction Improves School Meals in Chile." *Interfaces*. November 1, 2002.

²⁶ Catalán, Jaime et al. "No Such Thing As A Free Lunch? Think again. Combinatorial auctions help feed two million public school children from low-income families in Chile." *OR/MS Today*. The Institute for Operations Research and the Management Sciences. April 2009. 32-35.

process.”²⁷ In addition to being more transparent, the combinatorial auction system contributes to direct cost savings by more effectively analyzing costs of a complex set of bids. It is estimated that the computerized system of proposal assessment saves the government child nutrition programs in Chile US\$40 million yearly—equal to the cost of feeding 300,000 children for the year.²⁸

The call for bids is open to any company regardless of country of origin and all companies compete in the same way (there is no preference given to Chilean companies). JUNAEB currently works with 37 private contractors that provide school food. While most of these are Chilean owned, two are international—Sodexo and the Compass Group—and two others are under Brazilian ownership.²⁹ To ensure that prices remain competitive and stable in case one company is not able to meet its contracts, a single company cannot have contracts for more than 16% of JUNAEB’s total capacity.³⁰

3.4.6. Cook & Chill: Innovative Technology of Centralized Kitchens

In 2006, President Michelle Bachelet Jeria, asked that the number of school meals increase from 1.6 million meals served a day to 6.6 million and that more child care facilities be opened. In order to increase the number of meals served dramatically in a short period of time, JUNAEB researchers assessed multiple options. After researching potential alternatives, JUNAEB decided to prepare food in central “Cook & Chill” kitchen facilities and have it delivered to the schools. “Cook & Chill” is a specially designed process for large scale preparation of meals in a central kitchen. Using rapid cooling technology, meals are sealed in plastic bags and shipped cold to schools in ready to heat bags. On site, the meals are reheated (mostly through boiling the bags) and served. At the time of this study, 400,000 meals were being prepared daily by the Cook & Chill process (as compared to 2 million meals that were prepared onsite by conventional methods). Cook & Chill is used mostly in schools with a large number of students and in an area of high population density. Because the cost for the start up equipment for these plants was large, JUNAEB agreed to pay a slightly higher rate for Cook & Chill meals than for on-site preparation. JUNAEB estimates that in 5 years companies will have earned back the money from their initial investment.³¹

Addition information³²

National board for students aid and scholarships:

National board for students aid and scholarships is public corporation, national scope, 40 years old, created by law, technically related to Ministry of Education. It has 440 full time employees, publicly funded US\$ 180 million budget, 80% devoted to food program and the rest to health care and scholarships. All services are outsourced to private sector, profit or non profit.

School feeding program:

²⁷ Epstein, Rafael et al. “A Combinatorial Auction Improves School Meals in Chile.” *Interfaces*. November 1, 2002.

²⁸ Epstein, Rafael et al. “A Combinatorial Auction Improves School Meals in Chile.” *Interfaces*. November 1, 2002.

²⁹ For a list of JUNAEB school food service providers, please visit <http://www.junaeb.cl/home/certificados.htm#>.

³⁰ Ramón Solís Cácares, Chief of the School Feeding Department (Jefe Departamento Alimentación Escolar Dirección Nacional) of JUNAEB. Personal Interview. April 20, 2009.

³¹ Ramón Solís Cácares, Chief of the School Feeding Department (Jefe Departamento Alimentación Escolar Dirección Nacional) of JUNAEB. Personal Interview. April 20, 2009.

³² <http://www.gcnf.org/library/country-reports/chile/2004-Chile-School-Feeding.pdf>

- Offered daily to 1.5 million students, 35% of all the enrollees, targeting the most disadvantaged.

- Resources are allocated according to social risk of the schools measured through a questionnaire applied yearly to first grade in elementary and secondary level. Students coverage at school vary according to risk among 100% and 20%.

- Breakfast plus lunch at US\$46 cents (700 calories). JUNAEB pays per served meal

- Food service is outsourced to 37 private companies through a national bidding process in order to optimize economies of scale.

- Contracts last 3 years and are earned through a bidding process in which each company offer services to one or more territorial units in which the country has been divided. Last bidding process received more than 43.000 offers.

- Best offer combination is searched through a mathematic combinatorial model that analyzes offers in a blind way (no catering firm identification, only a code).

Control system consists in 6 dimensions monitoring:

1. Quantity of services, registered by a specific teacher each day in each school dining room (9,000 schools). According to teacher information JUNAEB pay the monthly bill to the companies.

2. Visual quality of service, registered by the same teacher, one per school (9,000) and each day of classes. Teachers can fine the catering company.

3. Laboratory analysis of served meal, measuring biologic safety and nutritional quality according with required standards. Fines are applied when no compliance is detected.

4. Laboratory analysis of food ingredients at school or company storages. Fines are applied when no compliance with standards is detected.

5. Student satisfaction registered by JUNAEB inspectors.

6. Serving conditions evaluated by JUNAEB inspectors, fine is applied when there are no compliance with standards.

Problems and challenges:

Quality control

- High competition among catering companies press for lower prices and there is a risk that some firms cut costs by lowering quality. (Fines had doubled in the last 2 years)

- There is a growing expectation that JUNAEB should spend more resources

- in control systems, and this compete with pressures for higher coverage

Food supply accounts for 40% of daily needs of the students

- Some of them eat much more than they need at home, resulting in obesity despite the program is focused on poverty

- Some of them, the very poor, because they are in the school feeding program, do not receive nothing else at home, suffering of some kind of undernourishment

- So different schemes are needed, according to social risk

- Food needs remains during holidays for a small group of students.

Identification and proper delivery is very difficult

- No effective way has been identified to expand coverage for the less poor trough co-payment

- Healthy scheme of our program competes with what it is offered by school kiosks.

Strengths

- Outsourcing service to private sector, have allowed lower cost, stronger performance of the program, higher employment and higher coverage
- Small institution, easy to manage
- Public recognition of the program
- Institution defined by law, with year budget defined by law, submitted by government and approved by the congress.
- Very sophisticated bidding process that enhances competition, transparency and efficiency (internationally awarded by IFORS in 2002)
- The program impact in diminishing school dropout in 25% of the beneficiaries and the estimated cost benefit is 1.3

3.5. CHINA

The Chinese school feeding system is described on the basis of the report delivered at the US conference in 2006³³ as well as school feeding needs assessment³⁴. The material will be specified upon the Seminar results.

3.5.1. Public Education in China

China is the biggest developing country all over the world, which is politically divided into 31 provinces and with more than 1.3 billion peoples. In total, there are about 215 million students studying in 890 thousands of primary and secondary schools. More than 70% of the students are living in the countryside.

The structure of public education in China influences the scope of school feeding and the ways in which programs are designed and operated. China has a vast public education system with an enrollment that exceeds 200 million students, spanning from kindergarten to high school³⁵ (Table 7).

The 1986 Compulsory Education Law guarantees that school-aged children have the right to receive at least nine years of free education up to age 16 (five years of primary education, followed by four years of secondary education). The Ministry of Education reports a 99 percent attendance rate for primary school students and an 80 percent attendance rate for primary school students. Additionally, according to a 2000 census, 90.9 percent of China's total population is considered literate.³⁶

³³ Cheng-Ye Ji. The School Feeding Practice in China. Presented at the 8th Global Nutrition Forum and the School Nutrition Association (SNA) Annual National Conference Los Angeles, California USA July 13-20, 2006. <http://www.gcnf.org/library/country-reports/china/2006-China-School-Feeding.pdf>

³⁴ Needs Assessment for Developing Sustainable School Feeding in Sichuan Province, China, November 2009. <http://www.gcnf.org/library/Sichuan-Needs-Assessment.pdf>

³⁵ Ministry of Education of the People's Republic of China. (2002). Basic Education in China. Retrieved August 27, 2009, from http://www.moe.edu.cn/english/basic_b.htm.

³⁶ CIA – The World Factbook. China. <https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html>

Table 7

Schools and School Enrollment

	China
Number of schools	456,900
Primary	
Intermediate	65,000
High School	14, 907
Total number of schools	536,807
Student enrollment	121,600,000
Primary	
Intermediate	66,900,000
High School	14,000,000
Total student enrollment	202,500,000

3.5.2. School feeding in China

School feeding has a rather short history in China. Since the early of 1980s, “school lunch arrangement ” has been set up spontaneously in several coastal big cities. In 1988, the Chinese Students Nutrition Promoting Association, an independent organization, was established, with the goal of uniting all stakeholders (public and private) to extend to all children the school feeding program and to improve the quality of the services. The school feeding program was strongly supported by Chinese government authorities, especially the Ministry of Education and the Ministry of Health.

In early 2000, the China School Milk Programme (CSMP) was launched in four cities and reached an estimated two million school children each day.³⁷ Although the government does not subsidize CSMP, milk is sold to urban school children at a discounted price, typically 25-30 percent less than the market price, which is offset by negotiation. CSMP supplements student diets while supporting the emerging dairy industry and the economy of China as a whole. The CSMP created 223 new jobs for every 100,000 children during its initial pilot phase.³⁸ In 2007, a model school milk program was implemented by Tetra Pak, with projections to distribute 5.3 billion milk packages to children.

The majority of school meal programs are located in urban areas, which creates a country-wide imbalance in student access to school feeding. School visits in Beijing showed extensive and high-quality school feeding programs that are reportedly replicated in other urban areas throughout the country. In Beijing, excellent school facilities were observed where students were offered selective menus served in handsome dining rooms. However, more than 70 percent of China’s students live in rural areas where malnutrition is most prevalent and access to school feeding is limited.

³⁷ Lai, B. (2003). Tetra Pak. School Milk Programme – The Economic Dimension

³⁸ Bundy DAP, Burbano C., Grosh M., Gelli A., Jukes M., Drake L. (2009) “Rethinking School Feeding: Social Safety Nets, Child Development and the Education Sector.” Directions in Development, World Bank, Washington, DC

Most lunch providers still cater to the tastes of the students who would prefer less nutritious choices, though more and more awareness programs have been provided to let schools be more conscious about nutritious lunch boxes. Because of the above reasons, school lunch network only covered 30%-50% of schools in the big cities, and 18%-35% of schools in the middle and small cities, respectively, in 2005. For the schools in the rural areas, especially in the poverty western China, actually no school feeding system exist until now.

The Chinese government does not typically subsidize school feeding. However, according to recent reports, in rural areas the government has agreed to subsidize 500 RMB (US\$73) for each primary school student, and 750 RMB (US\$110) for every middle school student, to help improve student nutrition.³⁹

The WFP has been active in China since 1979 and estimates that over one million primary and middle school students in 20 provinces and cities in China currently receive some sort of school meal, provided either by private catering companies or the school canteens themselves.

3.5.3. Policy regulations

No current official policies on producing, supplementing, distributing and servicing of the school feeding system are available in China. The country has yet to establish supportive policy or funding for a national school feeding program. In the absence of such policy, school feeding is operated independently by provinces, municipalities, cities, and schools. As a result, programs vary in quality, cost, and student access. Parents either pay for school meals or contribute rice to help offset charges. There is no planned free meal assistance for the neediest children and many children therefore have no food at school or are able to buy less than a complete meal. Only in several big cities, families with financial difficulties may, with the help by the Social Welfare Department, approach the school grants obtained by those eligible to cover mean allowance. Most of the schools with school lunch system can not reach the standard of the yearly minimum services: 165 schooldays.

In 2001, the China National Research and Development Center emphasized the importance of a healthy and balanced student diet by including nutrition in the government's 10th Five-Year Plan. The current 11th Five-Year Plan was introduced in March 2006 and also promotes public nutrition improvement. The new 12th Five-Year Plan reportedly aims to improve public services for all citizens, including compulsory education and public health⁴⁰. Following this policy directive, the Ministry of Agriculture and the Ministry of Science and Technology have further considered nutrition as one of the basic principles of development for the food industry⁴¹. In 2001, the Public Nutrition and Development Center (PNDC) was established to improve the health of Chinese people⁴². This new emphasis on public nutrition is now regarded as a responsibility shared by the Chinese government and the nutrition industry and continues to move into a high-speed development period⁴³.

At the present time, China is publicly acknowledging the importance of nutrition for the country's social and economic development. Although this is an important step forward, government commitment through supportive policy and funding have yet to be provided.

³⁹ Wang, Y. WFP. September 8, 2009 email

⁴⁰ Chinese Government's Official Web Portal. (March 23, 2006). NDRC Minister on 11th Five-Year Plan: The 11th Five-Year Plan: Targets, Paths and Policy Orientation. http://www.gov.cn/english/2006-03/23/content_234832.htm

⁴¹ Chinese Government's Official Web Portal. (March 23, 2006). NDRC Minister on 11th Five-Year Plan: The 11th Five-Year Plan: Targets, Paths and Policy Orientation. http://www.gov.cn/english/2006-03/23/content_234832.htm

⁴² The Center for Public Nutrition and Development Center. (2009) The Fourth Food and Nutrition Industry Forum. [Brochure]

⁴³ The Center for Public Nutrition and Development Center. (2009) The Fourth Food and Nutrition Industry Forum. [Brochure]

There is no central source for program-related information such as food cost, local farm production, employee training and funding mechanisms.

3.5.4. Institutional Structures

In 1994, a complex school feeding network, formed by national, regional and public operators and also by NGOs, were set up in this country. In most of the provinces, there is a branch of this complex. The number of the students who participated in the school feeding system swiftly increased from 2.35 million to 8.45 million only in one year.

By 2005, the Chinese Students Nutrition and Promoting Association, in conjunction with the National Institute of Child and Adolescent Health, met to establish a National School Nutrition Outline with plans to nationally expand school feeding and nutrition education. Pilot programs were often short-lived, but they have provided experience and other resources that would later help with broader program expansion. Although children are the primary beneficiaries, the pilots demonstrated additional benefits for the country, such as providing employment through program expansion and an increase in public- private partnerships.

3.5.5. Food Procurement (Sichuan Case)

Local resources are available to support a nutrition-based school feeding model. They include strong school and community commitment, an adequate supply of locally grown nutritious foods, and access to transportation for food delivery. The ongoing but limited school feeding in the target schools provides the basis for phasing in the model program. The essential missing element is government commitment through policy and funding to support sustainable program development and expansion.

The Deyang schools (located in Sichuan Province) purchase fresh foods daily from the local wet markets, public markets that offer a wide selection of meats, fish, vegetables, and some fruits. The DEB mandates that staple items (i.e., rice, flour, cooking oil) be ordered from DEB-approved and qualified suppliers. All schools are asked to document the procurement process, especially tracking their procurement sources and suppliers. Additionally, schools are asked to keep samples of each meal for 24 to 48 hours. If any food-related issues should occur, these samples can be tested to diagnose the problem. The DEB also discourages schools from offering cold dishes since uncooked food can more easily transmit viruses.

Although schools use locally-produced foods, farmers are not organized into cooperatives or other marketing groups to facilitate farm to school procurement. Grains, meats and poultry are purchased through licensed vendors who must make bids for school feeding contracts, and are overseen by the local provincial health department. There are typically two to three bids which are usually about ten percent below the market price. Vegetables are often purchased at the wet markets while fruits are always purchased directly from local farmers.

3.5.6. Student Meal Prices

The six target school sites serve two to three menu items and soup a la carte for the main meal. Students purchase any or all of these foods depending on their ability to pay for these services. A combined meat-vegetable dish costs 3.5 RMB.⁴⁴ In addition to this basic meal option, an enhanced meal of two vegetable dishes and one meat dish is available to purchase at 6 RMB. Many students in the target schools cannot afford any of these items. Instead, some poor families send their children to school with rice, which is then cooked at the school for the student's meal.

⁴⁴ The renminbi, abbreviated as RMB, is the currency of the People's Republic of China. As of November 2009, 7 RMB = 1 USD.

Families with boarding school students who can afford to pay for school meals are charged 300 RMB per month, which includes three meals a day. Parents can pay an extra 75 RMB per month for their children to receive an additional two snacks a day. The DEB estimates it would cost 3.4 million RMB (US\$500,000) a year under a tiered subsidy system to provide one daily nutritious meal to children whose families can only pay a portion of the meal. The source of this subsidized funding remains unclear. A universal free lunch for all 7,000 students at the six target school sites would cost an estimated 7 million RMB (US\$1 million) per year.

In the autonomous region of Guang Xi, located in southern China along the Viet Nam border, the China Development Research Foundation operates a pilot school feeding program where lunches cost an average of 1,000 RMB per student per year. This equates to between 2.5-5 RMB per day. Although these meals meet calorie requirements, they are not nutritionally balanced.

3.6. HONG KONG, CHINA

The school feeding arrangement is undertaken by the Education Bureau of the Hong Kong Government⁴⁵. In Hong Kong, there is a developed and adopted system of normative documents regulating operation in the school feeding sphere. One of the most important documents is represented by the Guidelines on Meal Arrangements in School⁴⁶, whose text is provided below.

Guidelines on Meal Arrangements in School

A. Important Points

Schools should, in accordance with their own circumstances:

- (1) set up a co-ordination group to work out the healthy and environmentally friendly school policy and practices to supervise, co-ordinate and improve the meal arrangements for their students. The group should be chaired by a senior member of the teaching staff and should comprise other staff and parent representatives;
- (2) establish appropriate procedures to select the lunch and snacks supplier most capable of providing healthy, nutritious and environmentally friendly lunch and snacks for students; and refer to the Education Bureau Circular on conducting trading operations in schools in receipt of public funds currently in force to ensure the arrangement complied with the fundamental principles and guidelines.
- (3) Take out “Strongly Discouraged Food Items” from all menu choices and stop the supply of snacks under the “Snacks to Choose Less” category in order to help reduce intake of total fat, salt and sugar by students with a view to preventing them from having long-term health problems.
- (4) adopt central/on-site portioned lunch service and ensure that there are adequate space, equipment (such as food warming devices and dish washing equipment) and manpower to maintain cleanliness, to portion and distribute the lunch efficiently and do the cleaning up after lunch;
- (5) open parts of the premises (such as hall, classrooms and covered playground) to cater for students staying in for lunch, create a clean, pleasant and healthy eating environment and provide sufficient time for the students to have lunch;

⁴⁵ <http://www.edb.gov.hk/index.aspx?nodeID=2&langno=1>

⁴⁶ <http://www.edb.gov.hk/index.aspx?nodeID=2470&langno=1>

- (6) encourage and motivate parents to co-operate by providing healthy lunch boxes/snacks for their children and to cultivate in them healthy and environmentally friendly eating habits;
- (7) discourage students from patronizing illegal hawkers. Complaints should be lodged to the Enquiry Hotline of the Food and Environmental Hygiene Department (FEHD) at 2868 0000 or directed to the respective District Environmental Hygiene Offices if illegal food hawkers operate outside the school; and
- (8) encourage teachers and students to acquire more knowledge about food safety, nutrition, balanced diet, personal health and ways of reducing waste and minimizing wastage; and introduce to parents the healthy and environmental policy on meal arrangement adopted by the school.

B. Healthy Lunch

- (1) The quality of school lunch depends very much on the choice of ingredients and the cooking methods used. An ideal and healthy lunch should provide for one third of the daily nutritional needs of a school child. The following are principles of a healthy lunch:
 - (a) provide grains and cereals (such as rice/pasta), vegetables and meat or its alternatives in the ratio of 3:2:1 by volume;
 - (b) contain fresh vegetables and fruit;
 - (c) provide whole grains, fat reduced dairy products and other calcium-rich food items;
 - (d) use lean meat, fish or skinned poultry;
 - (e) use low fat cooking methods such as steaming, boiling, minimal oil stir-frying or baking;
 - (f) use only vegetable oils, such as corn oil, canola oil, olive oil and peanut oil, in limited amount for cooking; and
 - (g) limit the use of grains and cereals with added fat or oil, fatty cut of meat and poultry with skin, whole fat dairy products, preserved or processed food and gravy/sauce of high fat or salt content.
- (2) Schools should, on top priority, take out “Strongly Discouraged Food Items” as mentioned in the “Nutritional Guidelines on School Lunch for Primary School Students” from all menu choices in order to help reduce intake of total fat, salt and sugar by students with a view to preventing them from having long-term health problems. Strongly Discouraged Food Items include:
 - (a) deep-fried food items such as French fries, deep-fried chicken wing and deep-fried pork chop;
 - (b) food items with very high salt content including salted fish and salted egg; (c) food items with added animal fat, trans fat, plant sources of saturated fat and hydrogenated fat such as butter, lard, coconut cream, palm oil and margarine; and
 - (d) desserts with added sugar or beverages in "Snacks to Choose Less" category as mentioned in the “Nutritional Guidelines on Snacks for Primary School Students”, including ice cream, cookies, candies and soft

drinks.

- (3) Ingredients should be well-cooked and reheated, and raw food or items requiring considerable handling should be avoided.
- (4) Hot dishes should be kept at 60°C or above and cold dishes at 4°C or below.

C. Green Lunch

- (1) Schools should adopt a lunch service which is conducive to promoting environmental responsibility and goes with the principle of “Reducing Waste and Minimizing Wastage” promoted by the Environmental Protection Department (EPD). Schools should encourage parents to provide packed lunches in reusable containers for their children to eat at school. Reusable lunch containers are now readily available from most lunch suppliers and schools are requested to switch to the use of reusable containers instead of disposal ones. In particular, schools are encouraged to consider adopting central/on-site portioned meal service if possible. The service can help reducing food wastage and has the added benefit of providing rice and vegetables cooked on site which are more nutritious.
- (2) To facilitate the provision of central/on-site portioned meal service, schools may apply for Community Waste Recovery Projects (Green Lunch) under the Environment and Conservation Fund (ECF) for installing kitchen facilities (e.g. heaters, cookers, boilers, sink, grease traps), kitchen furniture, dish washing facilities, utensils, and electrical/water installation works. Please refer to ECF’s website at <http://www.ecf.gov.hk/en/application/index.html> for details.
- (3) For schools with space problem and operational difficulties in implementing central/on-site portioned meal service at school, they are requested to adopt reusable lunch containers in place of disposable lunch containers. Please refer to EPD’s “Guideline on How to Promote Green Lunch in Schools” at https://www.wastereduction.gov.hk/en/schools/green_lunch.htm to distinguish between the two types of containers.
- (4) Schools should use reusable cutlery with spare sets for students who have forgotten to bring their own set of cutlery.
- (5) In situations where disposable lunch containers such as those made of polypropylene have to be used as the last resort when the recommended green lunch practices as set out in (1) to (4) above are being arranged, schools should contrive an environmentally friendly way to recycle the containers. Schools should include a condition in the contract to require the lunch suppliers to recycle the disposable lunch containers as well as food residues and monitor if the lunch suppliers have indeed made specific arrangements to do so. Active lunch box recyclers in Hong Kong can be found in EPD’s “Guidelines on How to Promote Green Lunch in Schools”.
- (6) Please refer to EPD’s “Guideline on How to Promote Green Lunch in Schools” at https://www.wastereduction.gov.hk/en/schools/green_lunch.htm for further information and support.

D. Selection of Lunch Suppliers

- (1) Schools should comply with the provisions in EDB circulars on “Trading Operations in Schools” and “Tendering and Purchasing Procedures in Aided Schools” currently in force, and pay particular attention to the following:

- (a) Schools should conduct quotations/tenders in an open, fair and competitive manner when selecting suppliers/service providers. Schools should select the trading operators/suppliers through tender/quotation exercises at regular intervals, preferably not exceeding three years.
 - (b) PTAs or SSBs are required to observe the principles and arrangements as set out in the circular should they be delegated by the SMCs/IMCs to make arrangements for trading operations in the schools.
 - (c) If PTAs or SSBs wish to undertake trading operations in the schools, they should be treated as one of the bidders and subject to competitive bidding and the same selection procedures applicable to other bidders. Under such circumstances, the tendering procedures should be conducted by the school.
 - (d) It is an offence under Section 9 of the Prevention of Bribery Ordinance for school staff to accept advantages from suppliers in connection with the selection of lunch supplier without his/her school's permission. Schools should not permit their staff to receive advantages (including payment of commission) from lunch suppliers.
 - (e) SMC/IMC members, school staff and parents involved in the selection of lunch suppliers are required to report any conflict of interest situations, financial or otherwise. Schools should properly record any declarations or disclosures made and the subsequent actions taken to avoid any actual or perceived conflict.
- (2) Schools are advised to make use of the Protocol on Selection of School Lunch Suppliers and sample tender documents developed by the Department of Health (DH) in consultation with EPD, which are available at http://school.eatsmart.gov.hk/links/he0013_html_en.html, for selecting lunch suppliers most capable of providing healthy and delicious green lunch for students. DH has laid down comprehensive procedures for the selection of school lunch suppliers, including forming a committee for selecting lunch suppliers, setting out service requirements and assessment criteria, issuing an open invitation to tender and adopting a pre-determined two-envelope system whereby the price and quality are taken into account in tender assessment.
- (3) Schools should not allow the choice of lunch suppliers to be in any way influenced by a donation, nor any other form of advantages (such as cash rebates, gifts, favours or catering services for free or at reduced prices). Schools should be aware that acceptance of advantages from suppliers likely compromises the quality of food or the price of the lunch boxes and invites public criticism. Schools are reminded of the general principles on acceptance of advantages and donations set out in EDB Circulars on "Acceptance of Advantages and Donations by Schools and Their Staff" and "Trading Operations in Schools" currently in force.
- (4) Schools should make sure that lunch and cooked food should be ordered from food suppliers holding a food factory licence with endorsement for the manufacture/preparation of lunch boxes. Schools should request the licensees of these food factories to provide documents to prove that their premises are licensed for the specific purpose. It is also applicable to the circumstance that the licensed food factory engages a sub-contractor to provide lunch boxes or manufacture the food items concerned on behalf of the licensees.
- (5) When selecting suitable school lunch suppliers, attention should be paid to the nutritional value of the food, the method of packing and transportation used by the lunch suppliers as well as the handling of the food containers after meal. Schools should only consider lunch suppliers that take account of the school meal policy and practices on health and environmental protection.

- (6) Schools are strongly advised to define food requirements and ways of waste reduction as the core component in the contracts signed with lunch suppliers by making reference to the “Nutritional Guidelines on School Lunch for Primary School Students” issued by DH, the “Guideline on How to Promote Green Lunch in Schools” by EPD and the “Guidelines on How to Ensure School Lunches Ordered Are Safe” issued by FEHD.

E. Healthy and Green Snacks

- (1) Schools should be careful in the choice of food items available for sale at the tuckshops and vending machines. Schools should be mindful of the nutritional value of snack items to be sold and ensure they may contribute positively to growth and development of children.
- (2) Schools should advise staff and tuckshop operators to:
- (a) increase the supply of and promote healthy snacks. These include:
 - bread and cereals which are low in fat, sugar or salt content such as whole wheat bread, unsweetened breakfast cereals, high fibre or plain biscuits etc.;
 - fresh vegetables and fruit, and dried fruit without added-sugar such as dried apricots and raisins etc.;
 - unsalted nuts and beans such as almonds, cashew nuts and peas etc.;
 - low-fat dairy products such as low-fat milk, yoghurt and cheese etc.;
 - and
 - low added-sugar beverages such as mineral water, 100% natural fruit juice, unsweetened or low sugar soy milk/oat drinks etc..
 - (b) keep hot dishes above 60°C and cold dishes at 4°C or below; and
 - (c) keep the tuckshop in a clean and hygienic condition; and
 - (d) obtain relevant restricted food permits from FEHD to sell those food items in Schedule 2 of the Food Business Regulation (Cap. 132X), including milk, frozen confections, non-bottled drinks, prepackaged sushi and foods sold in coin-operated automatic vending machine, etc. For application for restricted food permit, please refer to FEHD’s website at <http://www.fehd.gov.hk/licensing/guide.html>.
- (3) Schools should, on top priority, consider stopping the supply of snacks under the “Snacks to Choose Less” category as mentioned in the “Nutritional Guidelines on Snacks for Primary School Students” so as to help reduce students’ intake of total fat, salt and sugar. These snacks include:
- (a) energy dense food such as cream-filled buns, pastry, cookies etc.; (b) food high in fat such as deep-fried food, crisp and chips etc.;
 - (c) food high in salt such as food with curry sauce or black pepper sauce etc.; and
 - (d) food and drinks high in sugar or with minimal nutritional value such as candies, chocolate, ice cream, soft drinks, cordials, coffee and tea.
- (4) Schools are advised not to sell:
- (a) items which involve too much preparation and washing up afterwards; (b) items which are unsuitable for children such as alcoholic drinks; and
 - (c) items of cooked food which may easily be contaminated such as food that requires considerable handling.
- (5) In choosing food items available for sale at tuckshops and vending machines, schools should also follow the principle of reducing waste and minimizing wastage. In this connection, schools should avoid the supply of food with over-

packaging and the use of disposable containers. Where use of disposable containers is unavoidable, containers made of degradable materials should be used.

F. Selection of Snacks Suppliers

- (1) Schools should ensure that they have put in place a fair, open and transparent system of tendering and procurement procedures. Schools should make reference to the prevailing EDB Circular on “Trading Operations in Schools” to ensure that the arrangements comply with the fundamental principles and guidelines.
- (2) Tuckshops and vending machines are not mandatory facilities in schools. Snacks consumed at schools including those sold at school tuckshops or by vending machines directly influence students’ eating habits and their health. Hence, schools should pay due regard to the nutritional value of items to be supplied in the tuckshop in addition to the amount of rental payable by the tuckshop operator. Schools should define the choice of food items available for sale in the tender specification as well as the contracts signed with tuckshop operators by making reference to the principles of choosing healthy snacks as issued by DH in the “Nutritional Guidelines on Snacks for Primary School Students”.

3.7. INDONESIA

The school feeding system in Indonesia is described on the basis of the report delivered at the US conference in 2005⁴⁷. The material will be updated upon the Seminar results.

School Feeding Program Experience

In 2001, the government of Indonesia launched the school feeding program for elementary school student, it’s called “Pemberian Makanan Tambahan pada Anak Sekolah” (PMT-AS). By that time the school feeding program focused on eastern Indonesia. Previously the budget comes from the National Budget, but at present, on Decentralization Era, the budget shares between Central Government and Local Government Unit (Province and District), and some district, collaborates with International Non Government Organization (NGO) such as World Food Program (WFP) and UNICEF.

With the support from World Food Program (WFP), Indonesia is implementing a school feeding program for the children through distribution of biscuits and dried noodles. Biscuits and dried noodles are fortified with 9 vitamins (vitamin A, B1, B2, B6, B12, D, E, niacin and folic acid) and 4 minerals (iron, zinc, iodine and calcium).

General objective of school feeding program:

Improvement of physical stability among the school children as part of health and nutrition improvement program, so it can increase the quality of study as well as nine years basic education program.

Specific objectives of school feeding program:

⁴⁷ School Feeding Program in Indonesia (School Feeding Program Experienced in East Java Province). Present in Global Child Nutrition. Los Angeles, California, USA, July 12 – 20, 2005/. <http://www.gcnf.org/library/country-reports/indonesia/2006-Indonesia-School-Feeding-Program.pdf>

1. Improvement of school attendance among the school children.
2. Improvement the physical stability among the school children.
3. Socialization of local food preferred as well as “I Love Indonesian Food“.
4. Improvement of healthy life and healthy eat.
5. Improvement of community participation to provide diversified food based on local food.
6. Improvement of community participation on health and nutrition education and also family welfare.

Basic principle of school feeding program:

1. Use local food produced by one of the family or food vendors.
2. Content of calorie 300 kcal and protein 5 gram or minimal 15 % from total calorie per day.
3. As a snack and not full meal, and given around 9 – 10 am, during break time.
4. School feeding program to be given combined with health and nutrition education in the same time and also de-worming tablet.
5. Assessment of nutritional status , before and after school feeding program is needed to know the impact of school feeding program and can do periodically (monthly based).

Lessons learned from school feeding program:

1. Since 2006, particularly in East Java Province, the government policy of school feeding program under responsible by district government, the Province Government only support the school feeding program, and its call “Milk Drinking Program” 3 times a week for elementary school.
2. Some of the beneficiaries like if the school feeding program as a breakfast, so they prefer full meal not as a snack, particularly in the rural area, which they never have a breakfast before go to school.
3. School feeding program can increase the school attendance among the children, particularly in the rural area.
4. During school feeding program, de-worming tablets should be given in the same time, as part of Health School Effort, how to reduce the worm infection among school children.
5. To achieve the program, the role of teacher is very important to give a health and nutrition education, so it is needed the training for the teacher about health and nutrition.
6. Nutritional status assessment among school children should be done before and after school feeding program, its important to know, how the school feeding program can increase the nutritional status among school children.
7. All expertise in school feeding program, comes from Local Government Official particularly from Health Office, Community, University, NGO, Community Empowerment Board of Local Government, Family Welfare Movement (PK) member, Health and Nutrition Worker, under supervise by Ministry of Health and Ministry of Internal Affairs of Indonesia.
8. Monitoring and evaluation of school feeding program must be done regularly, due to know the successful and threat of school feeding program.
9. In Decentralization Era, the sustainability of school feeding program requires strong political support at every level of administration, start from village up to the provincial level, so it is needed advocacy and socialization to the stakeholders – including the legislative bodies - about the importance of school feeding program related to prevent malnutrition among schoolchildren.

3.8. JAPAN

In Japan, 99% of primary schoolchildren and 82% of secondary schoolchildren are provided with lunches. Parents pay about 300 yens per month for ingredients while the state compensates the canteen personnel work.

The prerequisites for the systematized school feeding include the Second World War consequences. The initial curator was represented by the US government.

Feeding plans are identical at all Japanese schools and developed by state dietitians. The ration originally including bread and milk was later supplemented by a variety of rice dishes. At the end of the 70s, the process of feeding westernization started, which resulted into the fact that today the Japanese menus are regarded as the most diverse in the region and include traditional West European cuisines.

3.9. KOREA

The school feeding system in Korea is described on the basis of the review on the present status and issues of school feeding programs in Korea⁴⁸. The material will be specified upon the Seminar results.

3.9.1. Current status of school meal service

The last decade has been the most dramatic years in the history of school nutrition programs in Korea. The percentage of schools serving school lunches reached almost 100% in 2003. In 2006, *School Meals Act* was significantly revised after serial outbreaks of food-borne illness among students having eaten school lunches. The safety and nutritional quality of school meals had remained as the biggest issue until the middle of 2000s, and then eco-friendly and universal free school lunches have become the main issues related to school meal service and are still under debate.

The compulsory education in Korea is nine years including six years of elementary schools and three years of middle schools. In addition, over 99% of Korean children attend high schools although high school education is not compulsory. Children are encouraged to choose healthy foods and learn good dietary habits through school meals and nutrition education. The school nutrition programs in Korea, therefore, refer to school meal service and nutrition education practiced in elementary, middle, and high schools.

School lunch service was first introduced to Korea in 1953 right after the Korean War with the aid of United Nations Children's Fund (UNICEF). *School Meals Act* was enacted in 1981, and has been revised to meet the needs of the time and public expectation since then.

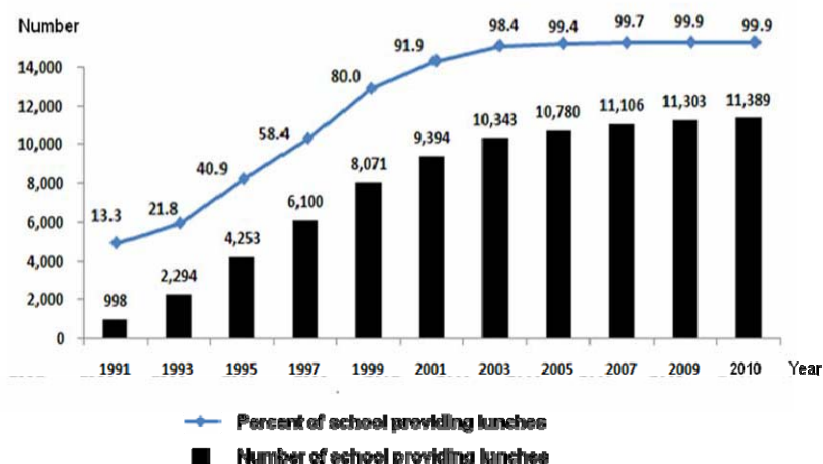
The percentage of elementary, middle, high, and special schools serving school lunches has reached almost 100% in 2003, from only 13.3% in 1991. As of 2010, 99.9% of 11,396 schools provided lunches for students (Figure 1). Among about 7,263,000 students nationwide, 98.8% students ate school lunches each school day.⁴⁹ Although school lunches are available in most of the schools, school breakfasts are served by only a few of boarding schools.

⁴⁸ Jihyun Yoon, Sooyoun Kwon, Jae Eun Shim. *Present status and issues of school feeding programs in Korea*. Dec. 2011. http://apjcn.nhri.org.tw/server/APJCN/Volume21/vol21.1/Finished/19_Korea_128_133.pdf

⁴⁹ The Ministry of Education, Science and Technology. *The 2010 Status of School Foodservice*. Seoul, 2011.

Figure 1

Expansion of school lunch service in Korea



Contract management companies were allowed to operate school lunch service as *School Meals Act* was amended in 1996. Participation of contract management companies in school lunch service made significant contribution to the rapid expansion of school lunch service despite insufficient government budget, especially in middle and high schools.

The number of schools contracting their lunch service with management companies has dramatically increased; in 2004, about 17% of schools contracted their lunch service with management companies.⁵⁰ But a large scale of food poisoning in contract-managed school lunch service in 2006 prompted *School Meals Act* to be renewed, thus many schools adopting contract-management switched their lunch service to self-operation based on the requirement of the law. In 2010, only about 5% of schools contracted their lunch service with management companies.²⁹

The average lunch price was 1,900 KRW (1.76 USD) for elementary school students, and 2,700 KRW (2.5 USD) for middle and high school students in 2010. According to the statistics in 2011, 79% of the schools served meals at cafeterias and 16% did so at classrooms; the rest 5% served meals at both the cafeterias and classrooms as the capacity of cafeterias was not enough to accommodate all the students.⁵¹

3.9.2. Menus and nutritional standard of school lunches

Generally, school lunches in Korea comprise of steamed rice, soup or stew, protein-rich side dish, extra side dish(es), Kimchi, and dessert. Whole milks are provided with school lunches or a few hours before school lunch service.

⁵⁰ The Ministry of Education and Human Resources Development. The 2004 Status of School Foodservice. Seoul, 2004.

⁵¹ The Ministry of Education, Science and Technology. How to Provide Safe and Quality Foods in Schools-The 2011 Training for School Foodservice. Seoul, 2011.

School lunches are served on trays made of stainless steel, which usually have five or six compartments. Staples and soup or stew are served in two big compartments of the lower part of a tray and side dishes and Kimchi are served in small compartments of the upper part of the tray.

Table 8 shows the nutritional standards of school lunches in Korea.⁵² This new nutritional standard, revised 10 years after the previous standard of 1997, was specified in the *Enforcement Rules of School Meals Act* renewed in January, 2007 following the comprehensive amendment of *School Meals Act* in 2006. The new standard included required amounts of energy and such nutrients as protein, vitamin A, B1, B2, C, calcium and iron per meal by age and gender groups.

The nutritional standard was established based on one- third of Dietary Reference Intakes for Koreans.⁵³ Actual energy provided by school lunches should be within $\pm 10\%$ of the nutritional standard. Energy from carbohydrate, protein, and fat should be 55~70%, 7~20%, and 15~30%, respectively. In addition to the quantitative nutritional standard, the following are stated to be considered in the process of menu planning of school meals; first, succession and development of traditional dietary culture should be considered. Second, various kinds of foods such as grains and starches, vegetables and fruits, fish, meat and beans, milk and dairy products should be used. Third, salt, oils and fats, simple sugar or food additives should not be overused. Fourth, natural and seasonal foods should be used as much as possible. Last, a variety of cooking methods should be utilized.³²

⁵² The National Assembly of the Republic of Korea. Enforcement Rule of the School Meals Act. 25/02/2009 [cited 04/06/2011]; Available from: <http://likms.Assembly.go.kr/law/jsp/main.jsp>

⁵³ The Korean Nutrition Society. Dietary Reference intakes for Koreans-First revision. Seoul: Hanareum Publishing Co, 2010.

Table 8

Nutritional standards of school lunches in Korea

Gender	Grade	Energy (kcal)	Protein (g)	Vitamin A (RE ¹)		Vitamin B ₁		Vitamin B ₂		Vitamin C		Calcium (mg)		Iron (mg)	
				EAR ²	RI ³	EAR	RI	EAR	RI	EAR	RI	EAR	RI	EAR	RI
Male	Primary school 1-3 students	534	8,4	97	134	0,20	0,24	0,24	0,30	13,4	20,0	184	234	2,4	3,0
	Primary school 4-6 students	634	11,7	127	184	0,27	0,30	0,30	0,37	18,4	23,4	184	267	3,0	4,0
	Middle school students	800	16,7	167	234	0,34	0,40	0,44	0,50	25,0	33,4	267	334	3,0	4,0
	High school students	900	20,0	200	284	0,37	0,47	0,50	0,60	28,4	36,7	267	334	4,0	5,4
	Primary school 1-3 students	500	8,4	90	134	0,17	0,20	0,20	0,24	13,4	20,0	184	234	2,4	3,0
	Primary school 4-6 students	567	11,7	117	167	0,24	0,27	0,27	0,30	18,4	23,4	184	267	3,0	4,0
Female	Middle school students	667	15,0	154	217	0,27	0,34	0,34	0,40	23,4	30,0	250	300	3,0	4,0
	High school students	667	15,0	167	234	0,27	0,34	0,34	0,40	25,0	33,4	250	300	4,0	5,4

¹ RE: Retinol Equivalent² EAR: Estimated Average Requirement³ RI: Recommended Intake

1. The nutritional standard of school lunches is presented for a meal; It may be flexibly applied according to the growth and health condition, level of physical activity, and region situation.

2. The average nutrition provision per student is to be evaluated for five consecutive days by season; following are the compliance ranges.

1) The energy should be =10% of nutritional standard for school lunch and the energy ratio of carbohydrates, protein, fat should be 55-70%, 7-20%, 15-30% respectively.

2) In case of protein more than required amount in the nutritional standard should be provided, but energy from protein should not exceed 20% of total energy.

3) In case of vitamin A, vitamin B₁, vitamin B₂, vitamin C, calcium, and iron, more than respective Recommended Intakes in principle and Estimated Average Requirements at least should be provided.

3.9.3. Issues regarding school lunch service

For the last decade, several issues related to school lunch service have been raised in Korea. These issues have been around quality aspects of school nutrition programs as quantitative expansion of school lunch service was completed by 2003. Among the issues, following are the most critical ones still under debate: safety of school lunches, universal free school lunch service and eco-friendly school lunch service. How to resolve these issues shall be the keys for the development of the school lunch service in Korea for the next decade.

In the early and middle of 2000s, safety issues have risen in school lunches as a series of outbreaks of food-borne illness in schools of which the foodservice was operated by management companies. Therefore, students' and their parents' trust on school lunches bottomed out and recovering trust on school lunches has been the biggest issue during the period.

Several local governments have enacted ordinances regarding use of eco-friendly food products in school lunches since 2003. Parents' needs for eco-friendly school lunches has become bigger as the incidence of atopic disease increased in school-aged children although the relationship between atopic disease and diet is not scientifically established. Nationwide interest in well-being and LOHAS also enlarged the demands for eco-friendly school meals. The percentage of the schools using eco-friendly foods in their lunch service is increasing but most of the schools partially utilize eco-friendly foods and still use ordinary foods as well mainly due to the relatively high price and limited supply of eco-friendly foods.

The School Meal Services Support Centers, with functions of central procurement and preprocess of food products for school lunches, started to be founded by local governments based on the amended *Schools Meals Act* of 2006. These centers are expected to contribute to providing schools with eco-friendly and high quality foods with lower prices. As of 2010, the School Meal Services Support Centers are being operated in 11 regions nationwide.⁵⁴ However, this movement of the respective local government needs to be examined for its efficiency from the perspective of the whole nation.

More recently, universal free school lunch service has become another big issue related to school lunch service. In the June^{2nd} local election in 2010, many politicians pledging to implement 'universal free school lunch' won. About 20% of the students eating school lunches had the benefit of free meal at that time; they were the children from low-income families or rural areas. If universal free school lunch service is implemented nationwide, the remaining 80% of students are also expected to benefit from free school lunches. This unprecedented policy in school lunch service is still under debate for its practicality and priority in budget allocation.

3.10. MALAYSIA

From the viewpoint of food security, Malaysia is classified by FAO as a country with 3% of its population suffering from malnutrition, which is regarded as insignificant. It is related to the complex and consistent socio-economic governmental policy of the government as well as various plans and programs implementation. As a result, in 2007 the nominal per capita income made up 6982.81 USD, the unemployment level – 3.5% while the consumer price index decreased by some 2.6%.

⁵⁴ Park YB. Study on Distribution Channels of Local Foods with High Quality in School Foodservice. The Ministry for Food, Agricultural, Forestry and Fisheries, 2010.

3.10.1. Legislative Regulation

The first developed policy in the agricultural sector can be referred to the first Malaysian agricultural plan and the first National Agricultural Plan. These documents were repeatedly extended for the purpose of achieving a required level of the national self-sufficiency by manufacturing agricultural products required for SFPs implementation. The 3rd National Agricultural Plan (1998-2000) was aimed at achieving 65% of the agricultural production level while by the end of the 9th mid-term Malaysian plan (2006-2010) there had been set an objective to reach the 85% level in order to reduce the trade balance deficit.

These plans imply the following tools:

- branch funding;
- management by objectives;
- establishment of the ensured minimal rice price;
- other incentives.

In spite of the program implementation, the rice production level in 2007 made up 72% of the required norm (against 74% in 1985). The growth of rice planting acreage and yield capacity was ensured (654,974 ha in 1985 against 676,111 ha in 2007). The yield capacity increased from 3.192 hwt / ha to 2.081 t / ha, from 1.335 t / ha to 3.887 t / ha, from 3.243 t / ha to 1.702 hwt / ha in the peninsular part of Malaysia, Sabah and Sarawak correspondingly. However, the highest agricultural productivity was neutralized by the birth wave. According to the statistics, the Malaysian population is characterized by a very rapid growth, i.e. from 15,680,000 people in 1985 to 27,170,000 people in 2007. As a result, per capita rice consumption reduced from 103 kg in 1985 to 81 kg in 2007.

3.10.2. School Feeding System Status

There are about 10,000 schools in Malaysia engaged in various SFPs. The country implements four types of programs:

- food supplementary program (771,000 participants);
- “hostel” (boarding school) program (371,342 participants);
- pre-school program (154,161 participants);
- “School Milk” program⁵⁵ (SMP) (621,000 participants).

The more detailed description of some of these programs is given in Table 9.

3.10.3. Engagement of Governmental Structures and Nonprofit Organizations

SFPs development and implementation is managed by the Ministry of Education of Malaysia with participation of the Ministry of Healthcare (menu compilation). Besides, the Ministry of Education cooperates with other ministries and agencies in cases of programs revision. The Department of Education Planning and Research managed by the Ministry of Education conducts regular program assessments engaging local universities for efficiency analysis performance in respect of these or those measures implemented within SFPs.

⁵⁵ In 2007, the “School Milk” program was temporally suspended due to cases of food intoxication. Till 2007, such companies as Dutch Lady and Nestle sullied 45 ml of milk for breakfast. The milk cost depended on the trading process.

3.10.4. Programs Development

Malaysia started implementing SFSs in 1980, then they were funded by the federal budget without any external assistance of such organizations as WFP.

The Malaysian government encourages healthy eating among children, especially those living in rural areas where there is frequently not enough food even for breakfast. The program objective is to allow students to start a school day by breakfast but not on an empty stomach.

The selection of schools for the program participation depends on certain criteria forming a basis for this or that guide. For example, in case of students engaged in the food supplementary program the family income should be over 40,047 RM, i.e. exceed the national poverty level. This program implies breakfast provision and costs 1.80 RM per one child.

However, all preschoolers are entitled to the pre-school program participation, under which students are provided with breakfast of 1.50 RM per one child. The meal package for boarding school students including breakfast, lunch and dinner costs 12-14 RM depending on the current menu.

3.10.5. School Food Providers

The program food preparation is mainly performed by school food providers (84.5%) as it is shown in Table 10. In rural schools where the amount of students is low (up to 200 people) and there are no canteens, food preparation was assigned to local community members (14.7%). There is only one school registered in Malaysia (Kuala region) where children food was prepared by teachers on a voluntary basis.

Such a considerable engagement of school food providers is mainly determined by their accessibility in the country. In most cases, the school administration just controls the process of the program implementation, monitors the quality of raw materials used as well as sanitary conditions of food preparation. According to the research results, the agreement concluded with food providers can be extended in 1-2 years. It is noteworthy that 65% of school food providers were selected for the program participation on a competitive basis. As a rule, the quality of food prepared in school canteens or with engagement of volunteers (teachers) is better than that supplied by food providers.

3.10.6. Food Supply Management

There are no stable relations between local agriculture and SFPs in Malaysia. Although, as a rule, local farms are not located next to schools, there exist certain local producers supplying food products to schools within a particular region. It is usually easier to purchase food products from the highland part of the country characterized by moderate climate and developed agricultural manufacturing. Outdoor markets offer various food products purchased by schools on a daily basis. In their turn, distributors should stick to the program budget.

Over 90% of school food products are manufactured within the country. Products most commonly used in school canteens include fried rice, noodles, fruit, beverages (coffee and tea), meat, poultry, and fish. The Malaysian Council of Ministers has recently adopted a resolution on including local fish into the menu of boarding school students. However, it took effect only in 2011 when the Ministry of Education held a corresponding tender. This system was launched on an experimental basis at a number of schools.

3.10.7. Local Engagement

In spite of the fact no direct support is provided by local public organizations for SFPs implementation, there is Parent Teacher Associations (PTAs) dealing with various school feeding issues. In case schools are limited by their capacity, for example, as far as food preparation is concerned as it is sometimes the case in rural schools, this association contribution into SFPs implementation is quite sufficient.

Table 9

Description of school feeding program in Malaysia

Name	Description	Responsibility	Strengths and weaknesses
Food supplementary program	<p><u>Essence:</u> Meals are served during the break (10.30 a.m. and 3.30 p.m.) and provide for 1/4 - 1/3 of the daily demand. The school canteen can opt for five menus out of twenty standard ones for five school days. The ration is based on the most popular products and can be adjusted in accordance with the current situation and children's preferences.</p> <p><u>Target audience:</u> primary schoolchildren (6 - 12 years) from low-income families. It is not aimed at replacing home food but implemented for the purpose of supplementary food provision.</p> <p><u>Coverage:</u> in 2004, about 38% of primary schoolchildren were engaged into the program implementation.</p> <p><u>Budget:</u> in 2004, the government allocated 124 million RM.</p>	Ministry of Education of Malaysia	Poor children's feeding and health have improved. Reinforcement of immunity for infectious agents as well as academic performance improvement are recorded. On the other hand, the program shortcomings include the school decision-making process related to children engagement into the program. Besides, some schools cross off fruit and vegetables from the menu based on the fact that children do not consume them.
"School Milk" program (SMP).	<p><u>Target audience:</u> children from low-income families</p> <p><u>Essence:</u> there are two schemes of SMP implementation: the first one implies that milk is provided to children from poor families on a free basis while the second one requires a partial payment to be performed by parents, all other expenses are covered by the state.</p> <p><u>Objectives:</u> SMP is aimed at building a milk drinking habit among schoolchildren thus increasing calcium (as well as other healthy micro- and macroelements) consumption among children.</p> <p><u>Budget:</u> 16 million RM.</p>	The program is implemented with participation of Malaysian dairy plants and the Ministry of Education.	N/A
"Hostel" (boarding school) program	<p><u>Target audience:</u> schoolchildren over 12</p> <p><u>Essence:</u> school food providers should plan their menu one or two weeks in advance on the basis of the state developed list.</p> <p>Children are served with three main meals, including breakfast, lunch and dinner, plus three snacks in the morning, in the afternoon as well as at dinner.</p>	Ministry of Education of Malaysia.	The main problem is the limited ration.

Table 10

Types of school food providers engaged into SFP

Name	Amount	Percentage
Contracted school food providers	109	84.5%
Volunteers	1	14.7%
Others	19	0.8%

3.10.8.Financing

SFPs are funded by the federal budget without any local bodies support. The Financial Department of the Ministry of Education is responsible for general financing of the Malaysian SFP. The federal government allocates funds to each of 16 Malaysian provinces, all of which take part in school feeding arrangement. Each province is responsible for reallocation of funds directly to schools.

Each school engaged into SFP possesses its own bank account. Students and their families never pay for schools meals while schools allocate funds to school food providers with federal means application.

The 2009 budget included:

- under the food supplementary program - 270.4 million RM (80,390,000 USD);
- under the preschool program - 53.1 million RM (15,780,000 USD);
- under the temporally suspended “School Milk” program - 27.4 million RM (8,140,000

USD).

In order to forecast the program expenses, schools gather statistics every October. Adjustments are made in April of the following year. There is a trend of SFP budgets extension, which is mainly related to the general increase of students amount.

3.11. MEXICO**Progresa Program**

Progresa⁵⁶ is the most recent food assistance program implemented by the Mexican Government. Initiated in 1997, it links food assistance to health and education programs. Currently benefiting over 400,000 urban and rural families in 12 States, the goal is for full coverage of the country within the next few years.

Progresa has three linked components:

3.11.1. Education

The Government provides scholarships and financial support for school supplies to encourage children to attend school.

In addition, the Government plans to increase the coverage and improve the quality of education by training teachers and improving school equipment.

⁵⁶ <http://www.ers.usda.gov/publications/FANRR6/fanrr6.pdf>

Scholarships are granted to each child in families covered by Progresa. The scholarships include school equipment or the financial support to obtain them and are given every 2 months throughout the school year. The higher the grade, the higher the amount distributed. Beginning in the first grade of secondary school, girls receive a higher allowance than boys. The scholarships are meant to ensure school attendance and to reduce the incentives to seek jobs at a young age or, in the case of girls, to do housework before completing their basic education.

3.11.2. Health

The coverage of health services is enhanced by equipping and training health-care providers. A basic free health services package is provided, and a nutritional supplement is given to all pregnant women and nursing mothers and to children less than 2 years old to decrease the number of undernourished children. Health self-care by the families is fostered through education and training in the areas of health, nutrition, and hygiene.

3.11.3. Nutrition

Financial support of 110 pesos per month is granted to the families to supplement their income. To help ensure that the money is used for food, this money is distributed to the female head of the household. This amount is indexed to inflation so the purchasing power remains the same.

Through education and information, families are encouraged to spend this money in a manner that will yield the most improvement in nutrition and well-being. Beneficiaries must make compulsory visits to health services, and parents must attend health courses.

3.12. NEW ZEALAND

3.12.1. School Feeding Programs

There is no national SFP in the country. In order to provide public schools with necessary financial assistance for supporting students in low-income regions, the social security index is used. (10).

One can specify the “Fruit in Schools” program developed by the Ministry of Healthcare and aimed at supporting schools activity in the sphere of improving students’ health and education quality. (24) Due to this program, schoolchildren are provided with the daily norm of fruit consumption. By selecting schools to be engaged into the program, a special attention was paid to those located in regions characterized by the low social security index. For example, in February, 2009 – June, 2010, all schools possessing the social security index of 1-2 were granted with a possibility of being engaged into the program.

SFPs implementation in the most controversial regions is regarded as the most important task of charity organizations. For example, the New Zealand Red Cross provided breakfasts to students of primary schools possessing the social security index of 1 from 2007 till the middle of 2011. (36) Besides, due to the “KickStart breakfast” program implemented by the “Fonterra” milk company and the “Sanitarium” health food factory, schoolchildren living in regions with the low social security index (1-4) are served with free breakfast twice a week. (30).

In New Zealand, child poverty elimination and national SFP development is undertaken by the “Child Poverty Action Group” independent charity organization. (5)

There are programs for providing financial support to schools located in low-income regions taking into consideration the social security index. (42). For example, the social security index determines the volume of those funds allocated by the federal government under the following programs:

Targeted Funding for Educational Achievement (TFEA) – a tool for providing assistance to schools with the social security index of 1-9 as a means of overcoming difficulties typical of students from low-income families.

Special Education Grant (SEG) – a program for providing assistance to schools, whose students undergo difficulties by learning and social integration.

Careers Information Grant (CIG) – a program for providing assistance to schools in respect of obtaining necessary funds meant for reducing expenses related to data provision in the sphere of occupations and vocational guidance. (9, 43)

Different age groups of students are covered by fits and start. (31) For example, the “Kickstart breakfast” clubs operate both at primary and secondary schools while SFS is mainly aimed at supporting primary schoolchildren as it is this very period that is regarded by the “Fonterra” company as determining further growth and development of children.

3.12.2. Regulating and Coordinating Functions of State Structures and Schools

The Ministry of Education performs coordinating and regulating functions in the school feeding sphere. In February, 2009, the National Administration Guideline (5) that served an important tool for providing useful and nutritional food in schools was abolished.

The Ministry of Healthcare develops feeding norms considering various dietary needs, recommendations for students and school food suppliers. (18)

The food safety assurance legislation is developed by the Ministry of Agriculture and Wood Industry. (22)

The New Zealand Food Safety Authority controls food products compliance with legislative requirements.

Schools management should ascertain itself of the fact that food providers supply food products meeting the reference nutrient intake. Contracts should include the following important points: offered products (in accordance with feeding recommendations for children and supplied food regulatory measures), food preparation, food security, quality control (ways of the contract provisions compliance are specified). (4)

3.12.3. School Feeding Legislation

The legal requirements to food quality are specified in four principal documents (16):

- the Food Act 1981
- Animal Products Act (APA) 1999
- the Agricultural Compounds and Veterinary Medicines (ACVM) Act 1997
- the Wine Act 2003.

The food industry sphere is governed by the Australia New Zealand Food Standards Code. (1) Producers comply with legal requirements in the sphere of food security provision based on special programs (20, 22):

Risk Management Programs (RMPs)

Food Safety Programs (FSPs)

Wine Standards Management Plans (WSMPs).

Food industry enterprises should operate in accordance with the Food Hygiene Regulations 1974 or implement the Food Safety Program (FSP)) in accordance with the provisions of the Food Act 1981. (21)

Under the Animal Products Act (APA) 1999, Risk Management Programs (RMPs) should be performed by all producers supplying or processing animal products. RMP is aimed at providing quality and proper marking of animal products as well as combating negative impacts of chemical, physical and biological factors within the technological process. (46)

The School Canteen Guide to Food Safety & Nutrition (NZ) 2011 is developed for providing necessary information resources to managers and canteen personnel for the purpose of children protection against food-borne diseases. (48)

Besides, there are recommendations meant for suppliers in respect of every food product and ways of it being served at schools. (3)

3.12.4. Ways of Food Provision

There are three ways of providing food to schoolchildren:

- lunch order. Students should order lunch by selecting one of possible options at the beginning of every school day. Ordered lunches are delivered to classrooms or distributed before the lunch hour. The menu includes cakes, stuffed rolls, biscuits and beverages:

- school buffet. Students can buy mainly ready-to-eat prefabricated products, including chips, various beverages, yogurts, cereal bars, tarts and candies. Besides, schoolchildren can purchase fresh baked food and stuffed rolls;

- canteen. Students are offered hot and cold meals, including hamburgers, sushi, stuffed rolls, sandwiches, soups, pasta, salads, and fried potatoes. Besides, one can purchase ready-to-eat prefabricated products, including chips, various beverages, yogurts, cereal bars, tarts and candies. Students can have their lunch at the canteen or take food with them.

Food can be provided to students by one of the abovementioned ways in 70% of primary and 90% of secondary schools. As a rule, primary schools opt for ordering lunches while at secondary schools students can purchase food in a school buffet or canteen though a possibility of ordering lunch is still preserved. However, most students do not purchase food at school on a daily basis. (53)

The abolishment of school feeding legislative regulation by the federal government resulted into the growth of harmful food products sales at schools. In the long-term, such a policy will lead to obesity, diabetes and other chronic diseases. (27, 50) Quite few schools sell fruit. Healthy products are sold at a high price. Over 50% of children and 60% of teenagers buy food in school canteens but very few of them consume healthy food. (51)

3.12.5. Food Provision Management

Such large companies as “Sanitarium” and “Fonterra” possess their own international distribution channels. (12) “Progressive Enterprises”, CJSC specializing in retail trade via the “Countdown” supermarket network provided food products for SFP implementation to the “Red Cross” charity organization in 2007-2011.

Logistics is managed by “Freshmax” and “Americold NZ Limited”. “Freshmax” supplies the “Countdown” supermarket network with fresh food products due to distribution centres in Oakland, Palmerston North and Christchurch. Products delivered to stores are supplied by providers from all over New Zealand, if possible, food products are purchased from local farms.

“Americold NZ Limited” provides chilled and frozen food products using distribution centres in Oakland, Palmerston North and Christchurch like “Freshmax”. (45, 23)

The “Freshmax” company controls the whole production cycle “from seedbed to plate”. The company cooperates with the best agricultural manufacturers supporting them by means of the “Freshmax” technological and travelling groups that help to ensure food quality and security. Besides, the company monitors the package requirements compliance providing quality control at this important stage.

3.12.6. School Food Cost

The average cost of breakfast provision at primary and secondary schools with consideration of food cost and other expenses related to its preparation and serving (7) are given below:

Cost of one breakfast	2\$
General administrative expenses (per one school)	1,000\$
Annual expenses related to SFP implementation (monitoring, control) (per one school)	12,000\$
Annual expenses related to school food purchase (per one student)	400\$

Data for schools located in regions characterized by the low social security index (1-3) (annual figures):

Number of schools engaged into the program:	614
Expenses related to SFP implementation (monitoring, control):	7,400,000\$
Food expenses:	10,900,000\$
General administrative expenses:	600,000\$
Total cost:	18,900,000 \$

3.12.7. SFP Financing

The government supports public schools activity. However, the budget funds allocated for SFP implementation are distributed by the ministries. For example, 12 million dollars is allocated for the “Fruit in Schools” program implemented by the Ministry of Healthcare on an annual basis. (49)

On the whole, SFP functioning is determined by the amount of payment performed by students’ parents as well as donations provided by commercial and charity organizations. (29)

The cost of school food provision to children makes up 250 dollars per week. (2)

Schools hold the budget allocating a part of its funds for school feeding provision. Parents make regular annual contributions in the amount of 100-250 dollars while a part of these funds is meant for students’ food compensation. School councils activity is supervised by the board of trustees that is accountable for the activity implemented at schools to the Ministry of Education. (32)

The total volume of federal monetary funds provided to schools and allocated for the initiatives related to feeding and students’ health improvement makes up 6 million dollars. (52)

3.12.8. Engagement of Business Structures and Other Organizations

As a rule, school councils are free to select food providers for SFP implementation.

In 2007-2011, the “Red Cross” charity organization program was implemented with participation of “Progressive Enterprises”, CJSC. “Progressive Enterprises”, CJSC owns the “Countdown” supermarket network that provided food products for SFP through the “Red Cross”. In the middle of 2011, the program was suspended in the wake of the “Countdown” supermarket

network refusal to provide school breakfasts. Breakfasts provision cost the supermarket network 200,000\$ per year. (55).

The “KickStart Breakfast” program is implemented by the “Fonterra” company and the “Sanitarium” health food factory. Since February, 2009, these structures have been supplying food products (milk and cereals correspondingly) for the “KickStart Breakfast” program implementation (30) to schools with the social security index of 1-4 on a free basis. Since then they have managed to provide schoolchildren with over 2.7 million nutritional breakfasts. The program is valid only twice per week for the purpose of bringing home to students the idea of healthy food necessity at the beginning of their school day. Currently, the program engages over 18,400 participants from 488 schools with the social security index of 1-4.

The “Healthy Heart” fund SFP is aimed at improving students’ health by providing them with nutritional and healthy food in sufficient amounts. The program has been valid at primary and secondary schools of New Zealand since 1989. (34)

The “Fonterra” company has also started implementing the “School Milk” program, which will enable schoolchildren to receive milk on a free basis. (13,14).

3.13. PAPUA-NEW GUINEA

3.13.1. School Feeding System Status

The Department of Education (DOE) provides nutrition education at all levels in both formal and informal education. Nutrition education is often incorporated into different subjects offered in primary and secondary schools. In community schools, for example, concepts and skills in nutrition education are taught in agriculture, health, community life and science. In provincial high schools nutrition education is one of the main components of home economics.

Other subjects such as agriculture, guidance and science have also integrated knowledge and skills on nutrition. Nutrition education is vital because it enables students to:

- Understand the relationships between food, good growth and all aspects of human development.
- To develop the skills of hygiene, food preparation and storage.
- To develop the skills in making wise decisions about food selection, preparation and consumption

The *Health Promoting Schools* initiative of WHO is also a key program, which highlights the opportunities to educate children and support healthy school environments. The success of the program is reliant on the enthusiasm of the teachers. Activities include regular preparation of healthy school lunches using traditional food to be enjoyed by all students, buddy systems using older children as role models at lunch, and parents having an opportunity to teach children about customs.

The importance of nutrition education and the crucial role of school setting is demonstrated by the joint UNESCO, WHO, UNICEF, Education International and the World Bank, FRESH framework. The Focus Resources on Effective School Health (FRESH) framework provides school health and nutrition policies, skills based education addressing health, nutrition, hygiene issues and delivers safe and simple nutrition services (deworming, micronutrient supplements and nutritious snacks to avoid hunger etc).

3.13.2. Engagement of Governmental Structures and Non-Governmental Organizations

In conjunction with Department of Health and/or Education and World Health Organization (WHO) initiate and implement nutrition education strategies and provide materials and teaching aids targeting protein energy malnutrition, anemia, noncommunicable diseases and iodine deficient disorders in the country.

The 16th Annual meeting of the National Agricultural Advisory Committee held in 1999 made some significant resolutions and recommendations with regard to national food security. These recommendations must be implemented and used as guides in formulating all national food programs. To promote food security, a farming systems approach is recommended, within which the FAO concept of food security should be pursued namely.

In line with the WHO Child Survival Strategy recommendations a National Child Health Advisory Committee was established in 2006. The Child Health Advisory Committee has a key role in coordinating and supervising Child Health activities. This committee reviews all child health policy areas, new evidence and information and provides recommendations to the National Department of Health (NDOH).

The committee has wide representation, including that from NDOH, the IMCI programme leader UNICEF and WHO, University of PNG, and a community Breast feeding support group. It meets quarterly, overseeing many child health activities. It is a vital link between child health workers, institutions and the NDOH. The CHAC has made recommendations or resolutions concerning all the activities mentioned in this document. A recent advance has been the appointment of an IMCI leader to be a member of the committee. General support to the policy, coordinating, and monitoring roles of the CHAC will be very important to maintaining a coordinated approach to child survival.

3.13.3. Program Development

In 1973, the first elected government formulated eight development aims. These aims can be placed in three groups, those in group 1 are primarily political in context and those in group 2 deal primarily with welfare economics. Group 3 has only one aim, and appears more closely connected to the national goal of PNG ways than any other goal.

In 1978 the National Public Expenditure Plan (NPEP) was introduced, and it caused a major change in the execution of government policy and business. Through this plan, government set in motion a process by which new expenditure would take the form of projects for which funding could be provided for, at the most, four year “rolling” periods. NPEP projects were organized around nine so-called strategic objectives. None appears to be connected with the aim of PNG ways, but this aim is something that is meant to permeate through all strategic objectives.

One of the objectives deals with food production and nutrition. These two elements have been separated because the improvement of nutrition is linked with the national goal of integral human development, while the improvement of food production is linked largely with self-reliance. The implementation of policy, particularly that relating to rural development, was greatly affected by the process of decentralization, which started in early 1977 and continued till 1980, when all the provinces had their own governments. The main focus of the NPEP was rural development; thus many of its activities became provincial functions. Funding came with the transfer of these functions, but in addition the NPEP offered provinces the opportunity to expand them through grants tied for projects. Three approaches were possible:

- Participation in a national sectoral program through collaboration with an appropriate line department,

- Formulation of an integrated rural development project, and
- Submission of projects to NPO separately and directly.

Serious problems of coordination and communication are most likely to occur in the sectors that have been partially decentralized. For example in the agriculture sector, the responsibilities are divided (Table 11):

Table 11

Distribution of responsibilities of mandated institutions

Responsibility	Mandated Institution
Policy and overall direction	Department of Agriculture and Livestock
Research	National Agriculture Research Institute, Oil Palm Research Association
Extension	Provincial DPI and other extension agencies such CCEA

3.13.4. Food and nutrition policy

The first Nutrition Survey was attempted in 1975 to compile a national picture of malnutrition levels in PNG. An inter-departmental working group was set up in 1977 to look into the issues of national food and nutrition policy in Papua New Guinea. This interdepartmental working group came up with the following recommendations:

- DPI (DAL) should be the coordinating agency for developing projects to process foods.
- Food Marketing Corporation and other organizations should be asked to begin development marketing.
- High priority should be given within five years (of 1981) to increase domestic food supplies to Port Moresby.
- Four instruments (Commerce, Transport, DPI and Labour and Industry) should give high priority to projects that develop marketing, processing, storage, transport, wholesaling and retailing of food.
- A nutrition education policy should be implemented.
- Regular nutrition education surveys are to be conducted and the National Planning Office (NPO) would co-ordinate the National Food and Nutrition Policy (NFNP) and report to the National Planning Committee.

The PNG National Nutrition Policy, March 1995 (which is a revision of the 1978 National Food and Nutrition Policy), states that malnutrition remains a significant problem in many areas and appears to be increasing in others.

The Government-presented PNG Medium Term Development Strategy 2005-2010 was the plan for economic and social development, firmly based on the Government's Programme for Recovery and Development. Its primary overall themes are good governance, export-driven economic growth, rural development, poverty reduction and empowerment through the development of human resources. There is a focus on recently-emerging threats to development, such as HIV/AIDS, high population growth, unplanned urbanization, dysfunctional service delivery systems and impediments to land utilization.

The Government Department of Agriculture and Livestock (DAL) developed a National Agricultural Development Plan, following inadequate documentation contained in the National

Agriculture Development Strategy; Horizon 2002-2012 (August 2001) and a White Paper on Agriculture, National Agricultural Development Policies 2001-2012. It is the responsibility of the National Agricultural Research Institute (NARI) to ensure that the new document puts adequate emphasis on the full utilization of traditional crops, including those listed above, rather than relying almost totally on the major export tree crops – oil palm, coffee and cocoa – and on introduced grain crops for national development.

3.13.5. Food Security

A detailed analysis of food security strategies for PNG was carried out and documented by Igua (2001). Subsequently, the National Food Security Policy 2000-2010 (May 2000) was developed as a response to concerns regarding the level of food imports and hence the long-term sustainability of national food security. The assertion was that PNG should take seriously the need to develop and strengthen its capacity to improve the domestic supply of food. Formulation of the plan involved a review of existing food-related policies; development strategies and programmes; projects and activities in food crops and livestock production; fishery- and forest-derived foods; marketing, processing, preservation and utilization. This was intended to complement the 1995 National Nutrition Policy. It gives, as the primary objective, an increase in and diversification of food production in order to achieve greater self-sufficiency and attain food security, both at national and household levels, by 2015. This can be realized through increased agricultural production and income earning from domestic marketing and exports.

It is important to develop cooperation between agencies dealing with agriculture, health and education, and improve the quality of food and nutrition education in the schools, vocational training centres, village development programmes and the non-formal education sector. Locally-produced foods should be endorsed as 'high quality', thus improving their status. There is a need for information kits and recipes for using local foods.

3.14. PERU

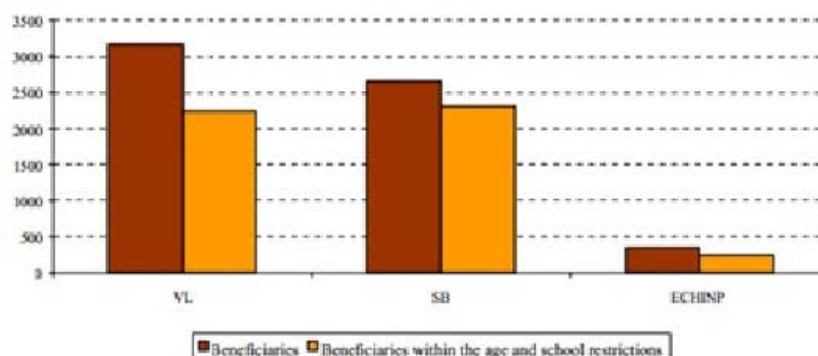
3.14.1. School Feeding System Status

Public food programs are receiving increasing attention in Peru after the large increase they experienced during the nineties. During that period, these programs grew not only in budget, but also in number. Several new programs were created that were run by different government agencies, with confusing or overlapping objectives and lack of coordination.

With the household-level information coming from the 2000 LSMS, it is possible to compare the size of the programs by the number of individuals that report themselves as beneficiaries of the program. (see Figure 2) The largest program, based on the number of beneficiaries, was the Vaso de Leche (VL), followed by the School Breakfast (SB). The VL program has 3.1 million beneficiaries, while the SB program has about 2.6 million. It is interesting to see that the number of SB beneficiaries match closely to the number of beneficiaries reported by the program, while that is not the case for the VL program. STPAN (1999) indeed reports that the VL programming is based on a total of 4.9 million beneficiaries. Nevertheless, the same study reports that some case studies found that the programming beneficiaries may be overestimated by as much as 100%.

Figure 2

Size of programs by number of beneficiaries (thousands)



Source: 2000 LSMS.

In addition to having the smallest budget, the ECHINP aggregate also appears as the smallest in terms of the number of beneficiaries, with an even larger difference, suggesting that per capita transfers are also larger for the programs involved. A brief description of each program included in the analysis is given below.

3.14.2. The School Breakfast (SB) Program

The School Breakfast Program is a nutritional program that targets public primary school children. It was created in 1992 with the general objective to improve the nutritional level of children between 4 and 13 years old so that they can enhance their educational achievements and attendance. This program is funded by the central government, through two public institutions: the National Food Assistance Program (PRONAA) and the Social Investment Fund (FONCODES). There did not seem to be much coordination between the two agencies, but FONCODES tended to concentrate much more in rural areas.

The School Breakfast Program evaluated is one of several carried out by the Peruvian government. In this case the program is run jointly with an international agency in three of the poorest departments (INEI, 1994) of Peru: Ayacucho, Apurimac and Huancavelica, all located in the highlands. One of the objectives of the program is to “eliminate hunger and reduce anemia through a nutritional supplement to children in preschool and primary school, so that the students’ ability to learn are improved”. The school breakfast program consists of cup of a milk-like beverage (with no lactose in it) in three flavors and 6 small biscuits. The nutritional composition of the breakfast is presented in Table 12.

Table 12

Nutritional Composition of the School Breakfast Daily Ration

	Beverage	Biscuits
Iron	7.2 mg	6mg
Calcium	480 mg	
Phosphorus	480 mg	
Zinc	6 mg	
Vitamin A	240 mg	
Folic Acid	60 mg	
Vitamin B12	0.84 mg	
Tiamin	0.60mg	
Riboflavin	0.72 mg	
Niacin	7.8 mg	
VitaminB6	0.84 mg	
VitaminC	27 mg	
Iodine	72 mg	

One ration of the breakfast is designed to provide energy (600 Kcal), protein (22.5 grams) and fat (20 grams). Also it is designed to provide 60% of the daily requirements of several vitamins and minerals needed by children, and 100% of the daily requirements of iron. The relatively higher iron supplementation is based on several studies that show the negative relationship between iron deficiency anemia and intellectual development and school achievement (Pollitt, 1990).

The breakfast is centrally produced so as to maintain nutritional quality. The biscuits are ready to eat and the beverage is in powder, so it has to be diluted in boiling water before serving. At each school parents and teachers are expected to form committees to receive and maintain the breakfast supplies and serve breakfast Monday through Friday during the school year (beginning of April through early-December).

One interesting fact is that the school breakfast program is mostly consumed at mid-morning. The reason is that most children have to walk long distances to get from home to school, often times more than 30 minutes each way up or down steep mountains, so parents will not let their children go to school with empty stomachs³ Since most students are not hungry when school classes start (around 8:30 or 9:00a.m.), and as a general rule parents are not available to prepare the beverage before 9:00a.m., the school breakfast is served during recess time (between 10:00 and 11:00 a.m.)

Delivery of breakfast rations occurs within public schools during one of the recreational breaks, and is organized by local committees formed by the mothers. In principle, the ration consists of a cup of a milk-like beverage, fortified with cereals, and six small fortified biscuits, and is the same for all children regardless of their age. In practice, though, local committees make adjustments to incorporate local inputs, mainly milk and grains produced in each area. PRONAA and FONCODES identified beneficiary schools based on the poverty level of the district in which they are located, and the number of students registered in primary levels determines the number of rations.

3.14.3. Vaso de Leche (VL)

The World Bank initiated the Vaso de Leche (“Glass of Milk”) program in Lima in 1984. It uses community municipalities as the basis for providing in-kind transfers of milk and other commodities including cereals and other milk products to households. Priority is given to the

‘firsttier’ group of households which consist of families with lactating mothers and children age six or younger. Once people in this tier have been provided for, the program distributes milk and related commodities to households with children from 7 to 13 years old, and people suffering with tuberculosis.

As determined by the World Bank at the commencement of the program, each municipality has an administrative committee and a Vaso de Leche Mothers’ Committee elected from within the respective neighborhood. These internal organizations determine program beneficiaries as well as the administration and allocation of goods within the municipality. The Vaso de Leche program became increasingly popular during the economic stress and downturns of the 1990s. After about 14 years as a program, Vaso de Leche was catering to 44 percent of households with children from age 3 to 11.

The Vaso de Leche program is based on a good theoretical framework for addressing malnutrition in poor communities. However, as studies have demonstrated, the program fails at various levels of implementation and is not a sustainable solution to the problem of malnutrition. If we measure success of the program with its ability to fulfill its mission, Vaso de Leche fails.

A majority of communal women’s kitchen are found in Lima (60%), with the rest in ‘urban coasts’. This means that most of the population served by this program is actually not poor or extremely poor. A study of this program, conducted by researchers at Tufts University, notes that the percentage of beneficiaries of the Vaso de Leche program that is not poor or extremely poor ranges from 60 to 68%. Most of the resources, therefore, are going to middle income Peruvians. In another study sponsored by the World Bank, David Stifel and Harold Alderman assess the impact of this program on households with low nutritional status before the program. After measuring the nutritional status of the same group of participants after the program, Stifel and Alderman come to the conclusion that even though the program functions well as an in-kind transfer to a large number of poor households, it only serves to decrease malnutrition rates by 0.28 percentage points. This is a dismal improvement rate for a program geared to solving malnutrition in the country.

The VL program started in 1984 and was designed to target children under 6 years old and pregnant or breast-feeding women, but has large leakages towards older children (from 7 to 13 years old) and the elderly. In that sense, it has a significant overlap with the school breakfast program. Funding comes from the treasury to the municipalities, which organize the purchase of the inputs that are then transferred to the registered local mothers’ committees. The mothers’ committees organize distribution to registered households. This often implies the reduction of individual rations when they increase the number of registered beneficiaries.

The distribution occurs in the municipal building, another community building, or the house of the elected local leaders. The ration varies by committee but it tends to include 250ml of milk, cereals and other products, and is often delivered without preparation. This is a key difference with respect to the SB program, and facilitates that the food is allocated among household members according the preferences of the mothers or household head, regardless of the indications of the program.

The size of the transfer to the municipalities is based on the poverty level of the district, but the transfer received by the household is affected by the number of committees registered in the municipality, and the number of families registered in the committees. These committees are in charge of verifying the poverty of the families in their neighborhoods and the presence of children in

the age range. There are no clear rules for the updating of the information and it is often claimed that many families that are not longer poor, or do not have children in the corresponding age, remain as beneficiaries.

3.14.4. Early Childhood Nutritional Programs (ECHINP)

Within the early childhood nutritional programs category, five relatively small programs have been chosen with similar objectives and target populations. All of them focus on children under 3 years of age. Four of them have exclusive nutritional objectives: the Nutritional Assistance Program for High-Risk Families (PANFAR), operated by the MoH, the Infant Feeding Program (PAI), operated by PROMUDEH, and two other programs run by NGOs (Niños and Nutrición Infantil). The fifth included program is the PROMUDEH integral childcare program, Wawa-Wasi, which also targets poor children under 3. All these programs deliver precooked food rations for children under three years old (papillas), but use different locations to distribute them PANFAR uses MoH health facilities and personnel, while the distribution mechanisms of the other programs are heavily based in the participation of the mothers of the beneficiaries, and often use the community center or pre- school buildings.

In the case of MoH programs, public health facilities are responsible for the identification of the socio-economic status of the family. Some health centers have developed means-testing instruments but others rely more on the subjective impression of social assistants. Beneficiaries are also recruited through the centers' extramural activities in which they register information on the socio-economic characteristics of the families and search for newborns and pregnant women. Rules vary by center, but if they are classified as poor or indigent, then they are offered the baskets of the program that applies. Still, the subjectivity of the process allows for significant leakage.

The objective of these programs is to help children that face nutritional vulnerability, but each one uses a different operational definition for nutritional risk. In the case of PANFAR, for instance, they were searching for families with parents with at most primary education or unstable employment status, pregnant and breast-feeding women at nutritional risk and/or who have recently given birth, or having more than three children under five (see Gilman, 2003). A family is eligible if they have four of the above characteristics, or if some of the children under five are undernourished. Eligibility is reviewed every six months, and the subsidy is retired if no child under five is undernourished, which generates a pervasive incentive for which anecdotal evidence is often cited.

Table 13 summarizes the key characteristics of the food programs analyzed in this study. As indicated above, the empirical analysis uses the information available in the Peruvian LSMS surveys. The LSMS is a multipurpose household survey with a representative sample at the national level as well as for 7 regional domains. It collects information on many dimensions of household well-being, such as consumption, income, savings, employment, health, education, fertility, nutrition, housing and migration, incomes, expenditures, and use of public social services.

The benefit incidence information comes from module of social programs (module 12) in the LSMS questionnaire. The first question asks to the key informant whether any member of the household benefited from each program in the 12 months prior to the date of the survey. If the answer is positive, she is asked to identify the members of the household that did. For the most part, I use the 2000 LSMS, which includes a sample of 3997 households and 19,957 individuals. For the marginal incidence analysis, though, I compare two rounds of the LSMS (1997, 2000) which have different sizes but similar sampling procedures and questionnaires in the relevant modules.

Table 13

Summary of Public Food Programs analyzed

	School Breakfast (SB)	Vaso de Leche (VL)	ECHINP
Start of the program	PRONAA: 1992 FONCODES: 1993	December 1984	PANFAR: 1988 Wawa-Wasi: 1994
Type of transfer	Food ration (prepared)	Food ration (pre-cooked)	Food ration (pre-cooked)
Delivery mechanism	Public schools	Mother's clubs	MoH facilities
Primary Target Group	Children between 4 and 13 years old attending to public primary schools	Children under 6 and pregnant and breast feeding women	Children under 3 at nutritional risk
Secondary Target Group	None	Children between 7 and 13, TB patient and elders	None
Geographic targeting	Yes	Yes	No
Household/ Individual	No	No	Yes
Target population size * 1/	5'189,807	8'802,312	2'074,662
Target population size * 2/	3,439,627	5,651,974	1,384,366

* Source: 2000 LSM

1/ Target population within the age and school restriction of each program.

2/ Target population within the age and school restriction of each program, who are poor.

3.14.5. Desayunos Escolares

Desayunos Escolares, or the Program of Scholastic Breakfasts, provides financial aid for states to operate programs of food distribution in schools and homes where infants are present. The program is operating in about 72,000 schools and institutions that serve an average of 7.4 million children a day. The program was established in 1966 as a two-year pilot project designed to provide categorical grants to assist schools serving breakfasts to undernourished children. In its first year, the program managed to serve 80,000 children at a cost of \$573,000. In 1975, the program received permanent authorization, continuing to emphasize participation of schools in severe need to improve the nutrition and dietary practices of children of working mothers and poor families.(42)

Studies of the program have shown that Desayunos Escolares has great potential to improve the learning capacity of students by, for example, improving short-term memory and nutritional state of children (43). However, the program would be more effective if it targeted populations with greater nutritional risk. Additionally, since there are two federally-mandated programs that aim to address nutrition in schools, implementation should be better coordinated or programs should be put together to reduce administrative costs and improve efficiency.

3.14.6. World Food Programme

The World Food Programs initiated its operations in Peru in 1964, and since then it has pursued its objectives to reduce poverty and food insecurity by providing food assistance and introducing systems for sustainable food production. WFP's programs are mainly concentrated in the Andean highlands (i.e. areas such as Ayachucho, Apurimac and Huancavalica as well as the region bordering Ecuador (59) where indigenous communities suffer from a greater lack of access to adequate nutrition in comparison with Peru's population on the coast. The World Food Program has attempted to fit its nutrition programs into the larger framework of the Peruvian government's public health objectives. It has also made consistent efforts to establish and maintain collaboration with its biggest donors (e.g. the United States and Canada), and to develop partnerships with local programs including PRONAA and CARITAS to facilitate its efforts in the field. By 2004, WFP's school feeding programs emphasized de-worming for school children, and provided nutritious snacks to help reduce anemia and enhance learning capacity for 82,500 primary school students (mostly girls).⁶⁰

Alternative methods for increasing the food supply and food variety in high altitude regions can include growing robust genetically modified crops and the creation of man-made ponds for fish farming. Although these represent possible programs to address nutritional issues in Peru's rural areas, they will most likely face opposition from local community groups and international organizations concerned with their environmental impacts. There are probably more politically feasible and sustainable ways to address access to healthy food without drastically changing the environment. The World Food Program may provide a better model for food support and sustainable food production.

3.14.7. Problems related to SFP Development and Implementation

In many of the rural regions of Peru malnutrition, especially child malnutrition, is seen as a normal or unavoidable life event. Unfortunately, many regional governments have not prioritized malnutrition as a serious health issue deserving of substantial funding. In November 2006, during the Andean Conference to end malnutrition, President Garcia was quick to blame regional governments for squandering mining tax revenues on new elaborate government buildings and other self-aggrandizement programs, instead of focusing on malnutrition. President Garcia stated that "The cost to countries from failing to eradicate under-nutrition is a staggering six percent of gross domestic product. Not only is under-nutrition impeding the development of individuals, it is acting as a brake on economic development."

At the national level, malnutrition programs are plagued by other problems. While significant resources have been dedicated to the issue over the years, progress has been slow. National malnutrition programs have been characterized by unresponsiveness to local needs and wasted resources. Government officials have reportedly been afraid to allocate resources to nutritional programs with a history of ineptitude, due to the fear that they may later be sued for misuse of funds. Yet another problem is the lack of inter-sectoral cooperation among Ministries and organizations to address more of the root causes of malnutrition, such as transportation and education, rather than simple reliance on food supplementation programs.

3.14.8. Financing

Peru's government supports a multitude of programs that address the challenges of malnutrition in the country. This section describes in detail the four government programs that most

directly address nutrition – Comedores Populares, Vaso de Leche, Desayunos Escolares, and the new PIN (Integral Nutrition Program) initiative – and suggests recommendations for improving each program’s effectiveness. The Peruvian government spends about \$250 million a year on food assistance programs to vulnerable populations in the country.

The programs analyzed are the largest public programs that target the health and nutrition of children in Peru. The total combined budget for the SB, VL and the ECHINP aggregate was US \$ 195 million in the year 2000, and represented more than 80% of the total public resources allocated to food programs. (Table 14) The VL is the largest food program with an annual budget of US \$ 93 million in 2000, closely followed by the SB program. (68 million) The ECHINP aggregate is significantly smaller with a budget of US \$ 35 million.

Table 14

Total Budget for Food Programs in Peru (thousands of US\$)

	1998	1999	2000
Vaso de Leche (VL)	97,645	90,273	93,159
School Breakfast (SB)	68,013	73,547	67,935
Child Oriented Food Programs (ECHINP)	38,324	55,471	34,673
Sub-total	203,982	219,291	195,767
Total budget food programs	234,565	266,967	240,278

Source: 1998-1999, STPAN (1999). 2000, Institute Cuanto (2001).

Over half of government expenditures for nutrition programs in Peru are spent on the Programa Vaso de Leche and Comedores Populares. In 2000, about 59% of the Peruvian government expenditure for food assistance was concentrated in these two programs, 43.1% and 15.8% respectively. Desayunos Escolares also receives a significant portion of funding from the government for its nutrition-targeted programs. With about \$51 million invested in Desayunos Escolares in 2002, it is the second most funded public nutrition program in Peru.

3.15. PHILIPPINES

3.15.1. School Feeding Program

The School Feeding Program⁵⁷ in the Philippines is called Breakfast Feeding Program (BFP) which was redesigned in SY 2010-2011 and piloted in selected schools in three (3) provinces using indigenous foods. Funds from the national government were transferred to the schools to enable the school heads to manage and implement the program at the school level. In SY 2011-2012, it was covered additional schools from sixteen (16) provinces.

The Department of Education (DepEd) initially conceptualized and launched the Breakfast Feeding Program (BFP) in 1997 to address the *short-term hunger (STH) syndrome* among the public school children. *Short-term hunger* is a condition experienced by children who do

⁵⁷ Descriptions and data presented in this chapter have been provided by Maria Corazon C. Dumlao, Officer-In-Charge, Health and Nutritional Center, Department of Education, Republic of the Philippines, by email at request of SIFA/

not eat breakfast and walk long distance to reach school. As the program progressed, it shifted to address a more serious problem of *undernutrition* which is a global public concern because it commonly causes death among children. However, this is preventable and treatable according to World Health Organization (WHO). According to the DepEd-Health and Nutrition Center (HNC) 2010 Report, 15.58% of the children in public elementary schools are undernourished and poor health and nutrition have ill-effects on the academic performance of the children. Under the Millennium Development Goals (MDGs), the target is to reduce the prevalence of *undernutrition* by 50% in 2015. Thus, the DepEd issues the Guidelines on the Implementation of the Breakfast Feeding Program for School Year (SY) 2011-2012 to arrest *undernutrition* among school children.

The BFP aims to rehabilitate at least 70% of the beneficiaries at the end of 100-120 feeding days. Specifically, the program aims to ensure 85-100% attendance among the target beneficiaries and improve the children's health and nutrition values and behavior.

Initially, the BFP was implemented in the selected three divisions/regions: namely: Division of Pangasinan under Region I, Division of Bohol under Region VII and Division of Lanao del Norte under Region X. The divisions were selected from among the twenty (21) divisions which are modeling the *Quality Management System (QMS)* following the policy principles of School-Based Management (SBM). It was expanded to the remaining fourteen (14) regions based on the following criteria:

- a. prevalence of *undernutrition*;
- b. training provided to school heads on SBM;
- c. capacity of the school heads to manage;
- d. disbursement and liquidation of funds; and
- e. awareness on procurement rules and regulations.

All regional directors (RDs), schools division/city superintendents (SDSs) and school administrators are enjoined to extend full administrative support to the management of the program. The School Health and Nutrition (SHN) personnel are expected to monitor the preparatory activities and the full implementation of the program and ensure submission of Program Terminal Reports (PTRs) at the end of the Feeding Program.

3.15.2. Breakfast Feeding Program Operational Guidelines (SY 2011-2012)

3.15.2.1. Description

The Breakfast Feeding Program (BFP) was initially conceptualized and launched in 1997 to address the "short-term-hunger syndrome" among public elementary school children. Short term hunger is a condition experienced by children who do not eat breakfast and/or walk long distances to reach school that result to non-attendance and/or inattentiveness in class. As the program progressed, it shifted from just addressing the short-term hunger to addressing a more serious problem of *undernutrition* in schools.

The BFP aims to provide hot meals to children following the developed standardized recipes using malunggay and 20 day cycle menu utilizing locally produced and/or grown foods. By following the menu, the beneficiaries are assured of additional 300 calories per day to address their nutritional deficiencies. To avoid commodity fatigue, a variety of vegetables from their garden produce may be added in the menu. This is the reason why schools are encouraged to establish vegetable gardens to serve as food basket and have a ready source of vegetables in school. Food

preparation maybe handled by the homeroom PTA on rotation basis or through the home economics/feeding teachers. The feeding program is also utilized as an avenue for the development of health and nutrition values and behavior among the children.

The BFP is to be implemented at the school level in accordance with decentralization efforts introduced through RA 9155 and the policy principles of School-Based Management (SBM) of DepED. The BFP also builds on the successful experiences in Negros Oriental with the localization of the Food for School Program. It is expected that the BFP will be included as part of the School Improvement Plan (SIP).

3.15.2.2. Objectives

General:

To rehabilitate at least 70% of undernourished beneficiaries at the end of 100-120 feeding days.

Specifically, the program aims to:

1. ensure 85-100% attendance among target beneficiaries; and
2. improve the children's health and nutrition values and behavior.

3.15.2.3. Mechanics of implementation

A. Priority target areas and schools

1. Pilot implementation

The BFP targeted the three (3) divisions from the 21 divisions modeling the Quality Management System (QMS) following the policy principles of School Based Management (SBM). These divisions were selected on the basis of geographic coverage (Luzon, Visayas and Mindanao), readiness on submission of nutritional status data, quick response to data requested, and familiarity with the guidelines on fiscal management.

Prioritization of schools shall be based on SBM assessment result and prevalence and magnitude of undernutrition.

2. New implementers for SY 2011-2012

The new implementers for SY 2011-2012 were identified by the Regional Health and Nutrition Unit (RHNU) Staff based on the following criteria: prevalence of undernutrition, training provided to school heads on SBM, capacity of the school heads to manage, disburse and liquidate funds, and awareness on procurement rules and regulations.

B. Priority target beneficiaries

The target beneficiaries shall be the undernourished kindergarten and Grades 1 to 3 pupils in identified schools. These grade levels are prioritized due to the high level of dropout rate, vulnerability to illnesses and undernutrition and they are considered at the critical stage of mental and physical development.

Each school is expected to record and submit the names of the beneficiaries, with their birthdate, age, weight in kilograms, height in meters, date of weighing and nutritional status during the first month of feeding.

C. *Duration*

To achieve a significant impact on the nutritional status of the children, the feeding shall be done for 100-120 days that is expected to commence within June 2011 to March 2012. The feeding days may be shortened if the actual beneficiaries exceeded the target beneficiaries or it may be extended if the actual beneficiaries are below the target beneficiaries. The following formula shall be followed in computing for the actual number of feeding days:

No. of feeding days = Budgetary allocation for feeding
(actual beneficiaries X P15.00)

A DepED Memorandum to this effect shall be issued prior to the commencement of the program.

D. *Creation of BFP Core Group*

The school heads/principals shall create a BFP Core Group from among the school personnel (teaching and non-teaching) and parents who shall be responsible in managing and implementing the program for the whole feeding cycle, they can only be replaced for valid reasons. The BFP Core Group shall be composed of two (2) teaching personnel and one (1) parent or one (1) teaching personnel and two (2) parents. The names of the BFP Core Group shall be submitted by the School Head to the Division Office as reference in granting service credits to teachers.

The BFP Core Group shall be responsible for the following:

1. Finalize the cycle menu for the whole duration of feeding;
2. Identify the target beneficiaries based on the set criteria;
3. Together with the school head, identify parents/volunteers who shall help in the whole duration of the program (these parents/volunteers should be in a good health condition);
3. Prepare the schedule of parents/volunteers who shall prepare the foods, cook the menu for the day, prepare the feeding area, supervise the daily feeding and wash the dishes;
4. Train the parents who shall help in the program on food pre
5. Do the recording and reporting using BFP Forms, and
6. Submit the terminal report at the end of feeding to the Division Office through the District Office.

E. *Commodities*

The school heads/principals shall have the authority to choose which food items to feed the targeted children based on the suggested recipes (Annex 2). In choosing the food commodity, special consideration should be given on the availability and sustainability of the supply in the area, reasonability of the prices and nutritional value that will help address the nutritional deficiencies among the children. A one-month or two-months cycle menu consisting of rice and a viand shall be prepared and followed.

From the Cycle Menu, the school head shall prepare a Work and Financial Plan (WFP) and a Project Procurement Management Plan (PPMP) for submission to the Division Office.

F. Procurement and delivery

1. The procurement of the food commodities shall follow the provisions of Republic Act 9184, otherwise known as Government Procurement Reform Act, and its revised implementing rules and regulations (Rule 1, Sec. 4.3 of the IRR). The existing school's Bids and Awards Committee (BAC) shall be responsible for the procurement of supplies and materials eligible for funding. In the absence of a committee, the School Head shall create one through a memorandum. The school's BAC shall be composed of five members consisting of school personnel. In the interest of check and balance, the school head shall not be a chairperson or member of the school's BAC. School SAC's recommendations for award shall be subject to school head's approval. Purchase orders shall be signed by the school head. Inspection and acceptance of goods shall be performed by the school's authorized representative.

2. All procurement shall be done through competitive bidding, except as provided in Rule XVI of the IRR of R.A. 9184.

3. Subject to the approval of the Head of Procuring Entity, and whenever justified by the conditions provided in R.A. 9184, the procuring entity may, in order to promote economy and efficiency, resort to any alternative methods of procurement, provided the most advantageous price for the Government is obtained. For this Program the Guidelines for Shopping and Small Value Procurement issued by the Government Procurement Policy Board (GPPB) shall be followed (Appendix 18 of the IRR).

4. For the procurement of food commodities, Negotiated Procurement particularly, Small Value Procurement (Section 53.9 of the IRR) may be used, provided, the threshold is not more than P500,000.00 as prescribed in Annex H of the IRR. At least three (3) suppliers will be invited to submit proposals.

5. The Request for Quotation (RFQ), indicating the specification, quantity, Approved Budget for the Contract (ABC), packaging, delivery and payment terms and quality/conditions of the item to be procured, shall be prepared by the School BAC and signed by the Chairperson.

6. In planning for procurement, the end-user should consider the most economical and efficient means of procuring food items, considering that quality of product and "freshness" should be guaranteed. Hence, ingredients needed in preparation for daily menu should be identified and summarized using the RFQ/Market form (Annex 3). For example, no. of kilograms rice/ "malagkit", kg. of chicken, garlic, onions, etc. for each menu per day.

7. The RFQ must also prescribe the manner by which price quotations shall be submitted i.e., by sealed or open quotation, and the deadline for their submission. In all instances, however, information relating to the examination, evaluation, and comparison of price quotations shall be kept confidential and should not be disclosed to any other party except to those officially concerned until award of contract.

8. RFQs shall also be posted for a period of seven (7) calendar days in the Philippine Government Electronic Procurement System (PhiiG-EPS) website, website of the procuring entity, if available, and at any conspicuous place reserved for this purpose in the premises of the procuring entity (e.g. school bulletin board), or other conspicuous place in the community (e.g. market, brgy. Hall, daycare center). However, in the following instances, this posting requirement shall not be applicable: (i) when there is an unforeseen contingency requiring immediate purchase under Section 52.1(a) of the IRR; or (ii) RFQs with ABCs equal to Fifty Thousand Pesos (Php 50,000.00) and below. The School BAC may seek assistance from the Division BAC if not the Procurement Service with regard to posting in the PhiiG-EPS.

9. After the deadline for submission of price quotations, an Abstract of Quotations shall be prepared setting forth the names of those who responded to the RFQ, their corresponding

price quotations, and the lowest quotation submitted. The school head shall approve the abstract of quotation if in accordance with the procurement process as provided by law.

10. Award of contract/Purchase Order shall be made to the lowest calculated and responsive quotation which complies with the specifications and other terms and conditions stated in the RFQ. The procuring entity must validate whether it is entering into a contract with a technically, legally and financially capable supplier by requiring the submission of relevant documents or through other means, e.g. business licenses, tax account number, availability of official receipts for payments received (and other accounting and auditing requirements).

11. For information purposes, all awards shall be posted in the PhilG-EPS website, website of the procuring entity, if available, and at any conspicuous place reserved for this purpose in the premises of the procuring entity except for those with ABCs equal to Fifty Thousand Pesos (Php 50,000.00) and below.

12. The terms for delivery and payment maybe made on a regular basis; e.g. daily, weekly every two (2) weeks provided it is indicated in the Contract/P.O.

13. The commodities should be delivered directly to the school. There shall be no additional charges for packaging and delivery of food commodities.

An authorized representative if not the principal/school head shall be responsible for receiving the deliveries of the food commodities.

a. He/She shall randomly check the deliveries to determine quality and quantity as well as check for expiration date if applicable.

b. In case the principal or school head is not available at the time of delivery, he/she shall designate an authorized representative to receive the commodities as confirmed in an authorization letter.

14. The authorized person of the school to receive food commodities shall use Form No. 2 in recording the deliveries of food commodities.

G. *Nutritional assessment of beneficiaries*

Height and weight of beneficiaries in targeted schools will be taken by the school nurse or the teacher using BFP Form 1. This data shall be the basis for assessing the improvement on the nutritional status of the children at the end of the program.

1. The new WHO Child Growth Standards shall be used as the basis for the computation of the nutritional status.

2. Baseline data shall be taken at the start of the feeding, every three months and end-line data at the end of the program.

3. A calibrated weighing scale, preferably beam balance, shall be used to take the weight and steel tape for the height.

H. *Feeding proper*

Feeding shall be done in the morning preferably before the start of classes. If and when feeding is conducted in between class sessions, children must be fed at the school feeding center/area or separate room to avoid disruption of classes.

1. Mechanics:

a. The food commodities shall be served and consumed inside the feeding area. Food commodities shall not be brought outside the school.

b. The parents of the children beneficiaries shall provide the feeding utensils such as plates, spoon and fork, placemats, table napkins/towels, and other feeding paraphernalia. They shall likewise be responsible for the washing of used utensils.

c. The principal or school head or his/her authorized representative shall be responsible for supervising the daily feeding.

d. Feeding shall commence as soon as food stocks are received.

e. Highest standard of hygiene for the preparation and serving of food must be practiced and observed.

f. Aside from feeding, the children should be taught proper hygiene such as washing of hands before and after eating, table manners, prayers before and after meals, simple concepts on health care, and importance of nutrition for their health and development, among others.

g. In order to facilitate the feeding and not to over-burden teachers, the PTAs, and other volunteer workers shall be mobilized and tapped to assist in the conduct of the feeding.

h. Children who participated in daily feeding shall be recorded in BFP Form 2.

i. In cases of any interruption i.e., school is used as temporary evacuation center, the principal or school head shall ensure that the feeding activity shall be for the targeted children only.

2. Adherence to Food Safety

Food safety standards shall be strictly enforced and adhered to at all times by complying with the following:

- a. Availability of potable water and hand washing facilities;
- b. Well-maintained, clean, well-ventilated and pest-free environment;
- c. Proper selection of foods and enduring they are fresh and in good quality;
- d. Washing/cleaning food items before storing;
- e. Storing dry goods dry storage area and perishable foods in cold storage area;
- f. Preparing/Cooking of foods on the day it will be served;
- g. Availability of food covers and containers for safekeeping;
- h. Hygienic practices on food preparation, cooking display, serving and storage;
- i. Ensuring that non-food items are not in the kitchen area, or if it cannot be avoided, they should be properly labeled and segregated from food items;
- j. Observing the expiry dates of food commodities; and
- k. A first-in first-out (FIFO) policy shall be observed in withdrawing stocks for the storeroom.

1. Storage and control system

A system on storing and control of food items in schools should be in place to ensure a smooth program implementation. School heads must allocate a space in school for storing foods. If no space is available, the principal may coordinate with the PTA or barangay officials for the provision of storage areas. To avoid the demand for large storage spaces, a staggered delivery system of food commodities maybe arranged with the supplier.

J. Attendance of pupils

Daily attendance of pupils and conduct of feeding shall be accomplished by the BFP Core Group using BFP Form 1. This will be used to monitor as to whether there was improvement on the attendance of the pupils and in their nutritional status.

K. Financial operations

1. The DepED Central Office, through the Budget Division, shall prepare Sub-ARO based on the approved listing provided by the Health and Nutrition Center. Sub-ARO shall be released to Division Offices concerned with copy furnished to Regional Offices.

2. Upon receipt of SARO, Division Offices shall request their corresponding Notice of Cash Allocation (NCAs) to their respective Regional DBM copy attached Sub-ARO and listings of recipient schools. NCAs shall be requested in accordance with the program of Division Offices relative to implementation of school feeding program.

3. Upon receipt of NCAs, a check shall be prepared and issued in favor of the School Principal/Head. The remaining allocation of the recipient schools shall be released upon submission of liquidation reports pertaining to the previous releases.

4. The manual on the Simplified Accounting Guidelines and Procedures for the use of Non-Implementing Units/Schools shall be adopted to account the receipts, utilization and liquidation of funds of non-implementing units.

5. Division Accountants are reminded of the necessary bond of the School Principals/Heads. Additional bond shall be sourced from the MOOEs of Division Office.

6. Immediately upon release of check to recipient schools, Division Accountants shall prepare and submit the Statement of Expenditures (SOEs) to their Regional Accountants for consolidation and the latter shall submit the consolidated reports to the Central Office-Accounting Division. It is encouraged however, that advance copy from the Division Offices may be sent directly to the Central Office-Accounting Division.

7. Expenses allowed under this program shall be food items only. Other expenditures necessary to implement the program such as transportation expenses, water, LPG, charcoal, firewood and kerosene are chargeable to HNC program funds allocated for the purpose.

8. The school heads shall be responsible in ensuring prompt liquidation of funds every three (3) months.

L. Monitoring and Evaluation

The program shall be monitored periodically to assess efficiency and effectiveness as follows:

National Level - semi-annual
Regional Level - quarterly
Division Level - bi-monthly
District Level - monthly

M. Submission of Reports

All school heads shall be responsible in the submission of a terminal report to include the following: program accomplishments; list of names of beneficiaries; issues encountered and actions taken; good practices or lessons learned and pictorials.

All terminal reports shall be submitted to the Division Office through the District Office, then to the Regional Office, and to the DepED Health and Nutrition Center. The Region and Division Offices are expected to consolidate all reports before submission to the Central Office.

N. AWARDS AND INCENTIVES

1. Granting of service credits to teachers

The services rendered by the teachers who are members of the BFP Core Group are eligible for service credits in accordance to the provisions of DepED Order No. 53., s. 2003 "Updated Guidelines on Grant of Vacation Service Credits to Teachers". The school heads are responsible for granting such incentives.

2. Search for Outstanding School Implementer of BFP

The best school implementer of BFP shall be recognized and awarded accordingly at the end of the feeding period based on the following criteria:

- a. percentage of beneficiaries rehabilitated to normal status;
- b. compliance to guidelines;
- c. prompt submission of liquidation reports;
- d. establishment of vegetable garden;
- e. good practices developed and lessons learned;
- f. involvement/support of parents and community;
- g. advocacy and social/resource mobilization activities

A best school implementer of BFP shall be identified from each region and the Most Outstanding BFP Implementer shall be awarded from among the seventeen (17) regional winners.

COMPLEMENTARY ACTIVITIES FOR EFFECTIVENESS AND SUSTAINABILITY

1. Deworming

a. Beneficiaries shall be dewormed before the start of the feeding so that the child will get the full benefit of the nutrients of the food.

b. The DOH shall provide the deworming medicines to schools through the regional health and nutrition unit that will be distributed to division offices and to schools.

c. The school nurse/feeding coordinator, teacher-in-charge, barangay health workers shall obtain parental approval before administering the deworming medicines and should be under the supervision of the medical officer.

2. Integration of the Essential Health Care Program (EHCP)

The Essential Health Care Program (EHCP) is a school-based health program of the DepED in partnership with the Local Government Units (LGUs), Fit for School Inc., and other stakeholders like UNICEF, Procter and Gamble, GMA Kapuso Foundation, Lamoian Corporation and Philippine Dental Association (PDA). The program advocates simple, doable and cost-effective health interventions that will promote cleanliness and prevent sickness among our school children.

EHCP is taught in schools and daycare centers as venues for health promotion and behavior change as they are the most appropriate places to reach children in a structured and organized way.

The package consists of daily handwashing with soap, toothbrushing with fluoride toothpaste and bi-annual deworming of children. Particular attention should be given to the importance of handwashing with soap and water as the simplest, most cost-effective way of improving sanitation and hygiene; reducing incidents of diarrhea by 44%; reducing acute respiratory infection by 25%; and preventing skin and eye infections and intestinal worms; thereby, increasing school attendance by 20% and improving academic performance.

Under EHCP, each child gets one toothbrush and has access to toothpaste, soap and deworming tablets. The amount needed for these materials is only P25 per child for the entire school year.

3. Orientation of Program Implementers

a. An orientation shall be held among school principals or school heads, teachers, day care workers, barangay officials, organizations of community and parents (i.e. PTAs, DCSPGs) and other stakeholders before program implementation to ensure effectiveness, common understanding of the program and the roles and responsibilities of implementers and stakeholders. It is also a good opportunity to seek the support of the community members (i.e., school alumni, affluent families, private corporations) in providing weighing scales (beam balance), storage facilities (refrigerators or freezers) and cooking and feeding paraphernalia.

b. DepED in coordination with the local TWGs, shall conduct the orientation for each level.

c. Topics for orientation shall include:

- i. Overview of the program
- ii. Background/rationale
- iii. Operational guidelines
- iv. Roles of PTA and other stakeholders in program implementation
- v. Training/Cooking demonstrations for teachers and parents
- vi. Food preparation and food safety concepts

4. Food Production in Schools/ School based Alay Tanim Program

a. *Gulayan sa Paara/an* Project (GPP) of DepED.

b. In compliance to DepED Memo No. 234, all schools should plant at least 50 malunggay trees within the school premises. An area in the school shall be allotted for production of nutrient-rich fruits and vegetables like: legumes, root crops, leafy green and yellow fruits and vegetables for feeding of underweight school children as well as to provide planting materials for home gardens. In urban areas, schools may adopt an urban gardening technology.

c. Initial planting materials shall be provided to the schools by the local agriculture office for the malunggay trees within the school premises.

d. The barangay council shall be encouraged to designate an area in the community where the parents of the beneficiaries could establish a communal vegetable garden as primary source of vegetables for the supplementary feeding. Initial planting materials may be provided to the households by the local agriculture office or the barangay council upon request.

e. Retention of good seeds and planting materials shall be encouraged as a regular source of replanting materials for sustainability.

5. Productivity, Life and Values Development Training

a. LGUs, in collaboration with NGOs and other government agencies are encouraged to conduct trainings on the following areas for parents in order to sustain family food security, increase school retention and improve the nutritional status of children in the long term.

- i. Values formation
- ii. Sustainable food production/gardening technologies
 - Bio-intensive gardening (BIG)
 - Food Always In The Home (FAITH) approach
 - Gulayan sa Paaralan Project
 - Fish culture using cement tank/drum
 - Urban gardening
- iii. Livelihood/income generating projects

b. Nutrition education

i. Nutrition education in schools aims to create positive attitudes, skills and promote life-long healthy eating and lifestyle behaviors. Thus, nutrition concepts consistent with the Nutritional Guidelines for Filipinos should be integrated in class discussions.

ii. Information education and communication materials provided by the NNC, i.e. posters on the Daily Nutritional Guide for Children 7-12 years, vegetables, eggs; *Pagkaing Sapat at Abot Kaya* exhibit materials; billboard on *Gabay sa Wastong Nutrisyon*, vegetable and egg; and *Pabasa sa Nutrisyon* kit could be used.

Beneficiaries and costs are given in Table 15.

Table 15

BREAKFAST FEEDING PROGRAM (SY 2011-2012)
TOTAL RECIPIENTYS FOR SY 2011-2012 (PILOT AND NEW AREAS)

REGION	DIVISION	DISTRICT	SCHOOLS	BENEFICIARIES			FEEDING	OPERATIONAL	TOTAL
				Kinder	Grades I-III	Total	COST	COST	COST
I	PANGASINAN I	2	15	84	287	371	667 800.00	22 260.00	690 060.00
	PANG I PILOT	<u>29</u>	<u>113</u>			<u>11 003</u>	<u>26 407 200.00</u>	<u>667 200.00</u>	<u>27 074 400.00</u>
		31	128	84	287	11 374	27 075 000.00	689 460.00	27 764 460.00
II	QUIRINO	8	18	88	1 009	1 097	1 974 600.00	65 820.00	2 040 420.00
III	ZAMBALES	2	21	194	725	919	1 654 200.00	55 140.00	1 709 340.00
IV-A	BATANGAS	1	15	0	1 853	1 853	3 335 400.00	111 180.00	3 446 580.00
IV-B	OCC MINDORO	9	24	828	3 950	4 778	8 600 400.00	286 680.00	8 887 080.00
	OR MINDORO	<u>1</u>	<u>4</u>	<u>144</u>	<u>555</u>	<u>699</u>	<u>1 258 200.00</u>	<u>41 940.00</u>	<u>1 300 140.00</u>
		10	28	972	4505	5477	9 858 600.00	328 620.00	10 187 220.00
V	SORSOGON	4	59	682	2 152	2 834	5 101 200.00	170 040.00	5 271 240.00
VI	KABANKALAN	5	64	649	3 747	4 396	7 912 800.00	263 760.00	8 176 560.00
	BACOLOD CITY	<u>6</u>	<u>16</u>	<u>413</u>	<u>2 623</u>	<u>3 036</u>	<u>5 464 800.00</u>	<u>182 160.00</u>	<u>5 646 960.00</u>
		11	80	1 062	6 370	7 432	13 377 600.00	445 920.00	13 823 520.00
VII	BOHOL	8	21	0	1 000	1 000	1 800 000.00	60 000.00	1 860 000.00
	BOHOL PILOT	37	289			8 222	19 732 800.00	1 214 400.00	20 947 200.00
	NEGROS ORIENTAL	<u>23</u>	<u>75</u>	<u>382</u>	<u>1 894</u>	<u>2 276</u>	<u>4 096 800.00</u>	<u>136 560.00</u>	<u>4 233 360.00</u>
		68	385	382	2 894	11 498	25 629 600.00	1 410 960.00	27 040 560.00
VIII	LEYTE	10	89	942	2 532	3 474	6 253 200.00	208 440.00	6 461 640.00
IX	ZAMBO DEL	14	22	178	835	1 013	1 823 400.00	60 780.00	1 884 180.00

	NORTE								
X	LANAO DEL NORTE	6	12	98	458	556	1 000 800.00	16 680.00	1 017 480.00
	LANAO PILOT	<u>23</u>	<u>67</u>			<u>4 286</u>	<u>10 286 400.00</u>	<u>332 800.00</u>	<u>10 619 200.00</u>
		29	79	98	458	4 842	11 287 200.00	349 480.00	11 636 680.00
XI	DAVAO ORIENTAL	8	28	564	1 545	2 109	3 796 200.00	126 540.00	3 922 740.00
XII	SULTAN KUDARAT	9	56	582	1 896	2 478	4 460 400.00	148 680.00	4 609 080.00
Caraga	SURIGAO DEL NORTE	5	20	277	1 025	1 302	2 343 600.00	78 120.00	2 421 720.00
CAR	KALINGA	8	12	107	338	445	801 000.00	26 700.00	827 700.00
NCR	QUEZON CITY	1	7	610	2 481	3 091	5 563 800.00	185 460.00	5 749 260.00
ARMM	MAGUINDANAO	4	6	304	1 703	2 007	3 612 600.00	120 420.00	3 733 020.00
TOTAL:	21	223	1 053	7 126	32 608	63 245	127 947 600.00	4 581 760.00	132 529 360.00

3.16. RUSSIA

3.16.1. General Status of School Feeding

As of the beginning of the 2008 academic year, in the Russian Federation the total amount of students of 7-11 years made up 4,983.3 thousand people while of 11-18 years – 8,015.5 thousand people. The hot meals coverage amounts to 77.5%. Only breakfasts are provided to 58.8%, only lunches – to 21.9%, two meals daily – to 19.3%, snacks – to 3.2% of children. Canteen food is purchased by 25.0%⁵⁸.

The analysis of the results of the 2002 All-Russian Preventive Medical Examination that implies the checkup of 30,400 thousand children of all age groups revealed the decrease of the healthy children percentage (from 45.5% to 33.89%) along with the double growth of the share of those children suffering from chronic diseases. 8% of the examined children were characterized by certain health deviations, i.e. 4.5% suffered from weight deficit, 2.1% - from overweight while 1.6% were rather short. Besides, the children's health was considerably affected by their families' low incomes, which did not allow providing these children with ultimate nutrition within their residence area as well as paying for food at education establishments. So it is no wonder that within that period weight deficit was registered by 6.16% of young men of 17-18.

The existing situation called for certain measures implying fulfillment of the following tasks:

- scientific foundation of directions of students catering arrangement improvement, increase of food quality, harmony and security;
- development of food and information technologies at catering units of general education establishments;
- creation of the efficient management system in this sphere;
- gradual increase of state support of the school feeding system and full provision of hot meals to schoolchildren;
- reasoning for the system of measures aimed at personnel development;
- development of private-public partnership and civic institutions, mechanisms of public control over students catering status;
- determination of the catering sphere legal and regulatory framework improvement directions at general education establishments;
- growth of measures efficiency in respect of building rational food behavior and knowledge about healthy eating foundations by children, teenagers and their parents.

3.16.2. National School Feeding Program

There is no National School Feeding Program (SFP) in Russia. Large regional programs are developed and implemented, for example, those in Moscow and some other federal subjects.

For purposes of school feeding improvement, the Russian Federation implements the following framework measures, including:

1. Measures aimed at resolving tasks related to infant and maternal mortality level decrease, enhancement of people's reproductive health, health of children and teenagers implying arrangement of high quality hot meals provision to schoolchildren and students of elementary vocational education establishments, including free meals for children from low-income families (Conception of Demographic Policy of the Russian Federation till 2025 adopted by Order of the President of the Russian Federation No 1351 as of 09/10/2007).

⁵⁸ Report of the Federal Service for Consumer Rights Protection and Human Welfare of the Russian Federation on the sanitary and epidemiological situation in the Russian Federation in 2008

2. Measures under Regulation No 799 of the Government of the Russian Federation approving the 2008-2009 Rules of Providing Federal Financial Support to Subjects of the Russian Federation for Implementing Experimental Projects Related to Students Catering Arrangement Improvement at State General Education Establishments of the Subjects of the Russian Federation and Municipal General Education Establishments.

3. Experiment aimed at improving students catering arrangement at state general education establishments of the subjects of the Russian Federation and municipal general education establishments (Order No Pr-2065 of the President of the Russian Federation d.d. December 10, 2005).

In 2008-2011, within the experiment framework the subjects of the Russian Federation considered all aspects of high quality and accessible well-balanced school feeding arrangement, including technological, organizational and management, legal and regulatory, educational ones. Within four years of the experiment implementation, 2 billion 100 million rubles (2008 – 500 million rubles, 2009 – 1 billion rubles, 2010 – 300 million rubles, 2011 – 300 million rubles) was allocated from the federal budget. Besides, 2 billion 458 million rubles was provided from regional and local budgets for the experiment implementation. So the consolidated budget funds allocated for the experiment implementation in 2008-2011 made up over 4.5 billion rubles.

Upon the experiment completion, the following meaningful results were achieved:

- out of the co-financing funds, school catering units were repaired and reconstructed, outdated service lines were substituted in accordance with the sanitary and epidemiological requirements to their placement, space and planning and constructive decisions;

- out of the federal funds, school catering units were furnished by modern technologically advanced equipment in accordance with the requirements to equipment, inventory, utensils and containers specified by the Sanitary Regulations and Norms;

- out of the regional and local funds, new furniture, utensils for school canteens, specialized automobile transport were purchased;

- systems of school feeding non-cash settlements are being integrated, which allows preventing improper use of parents' money meant for hot breakfasts and lunches payment;

- food rations and approximate cycle menus were developed and approved for students in accordance with the Sanitary Regulations and Norms.

4. Regional programs related to school feeding system arrangement improvement, etc. In 2011, in 35 regions the specified measures were implemented within the framework of regional programs, in 48 regions they were taken within long-term regional programs of education development, programs of state policy implementation in the sphere of healthy eating, demographic development programs, etc. In 63 subjects of the Russian Federation, municipal programs of school feeding arrangement improvement were valid. In 2012-2014, the abovementioned experiment regional coverage will be extended.

The result of the abovementioned and other framework measures testifies to the fact that at schools engaged into the experiment:

- about 96% of all students are provided with well-balanced hot meals;

- monitoring of students' health state revealed a certain degree of stabilization as well as a well-defined trend of schoolchildren's health improvement. Within the reported period, the age group of 5-9 grades students was characterized by the decrease of the amount of those schoolchildren suffering from food-born diseases (anemia – from 0.49% to 0.37%, obesity – from 0.62% to 0.59%, digestive diseases – from 2.57% to 2.3%). The share of 10-11 grades students with the 1st health group increased (from 2.42% to 3.11%). The amount of schoolchildren suffering from digestive diseases had fallen from 0.97 to 0.86% by the end of 2011.

For the purposes of further school feeding arrangement improvement in all subjects of the Russian Federation, it is planned to:

- continue conducting the annual all-Russian school feeding monitoring for the purpose of assessing its status and implementing a comparison analysis of the results of regional and municipal executive bodies corresponding activity;
- create basic resource centres for coordinating activity related to students catering arrangement improvement and personnel development in each of eight federal districts within the framework of the Federal Target Program of Education Development;
- ensure efficient activity of regional training sites for instructing school and catering unit managers and responsible specialists about modern school feeding arrangement technologies on the basis of interregional cooperation;
- continue activity aimed at building the health eating culture by children, their parents, and teachers.

3.16.3. Institutional Framework

In the Russian Federation, the structure of school feeding system participants can be considered on the basis of organizations and plants makeup, their objectives and tasks in the process of its functioning. The main types of activity (tasks) implemented in this sphere include delivery, production, management and control, consumption. These types of activity are performed by the following system participants:

- raw materials suppliers for manufacturing school feeding products (agricultural products manufacturers and suppliers);
- services suppliers operating in the sphere of catering arrangement at general education establishments (school food manufacturers);
- managing and controlling organizations;
- school food consumers (students and personnel of general education establishments).

The structure of school feeding participants in the Russian Federation is given in Fig. 3.

3.16.4. Policy

The state authorities of the Russian Federation directly related to the sphere of students catering arrangement are entitled to do the following:

- to provide orphaned children and children without parents' guardianship with free food within the period of their staying at a corresponding state or municipal establishment;
- to ensure additional backing of catering arrangement events at municipal education establishments.

Feeding support of most students of general education establishments as well as funds allocation for purchasing equipment, utensils and furniture is not included into the obligations of the Russian state authorities.

The general powers of the state authorities of the Russian Federation related to the sphere of students catering arrangement include the following:

- state policy implementation in children's interests;
- development and implementation of regional education development programs with consideration of national and regional peculiarities;
- establishment of additional requirements extending the scope of federal requirements to education establishments in respect of construction norms and regulations, sanitary norms, students' health security for education establishments within the jurisdiction of the subject of the Russian Federation;
- control and supervision over education establishments of the subject of the Russian Federation and municipal education establishments.

Functions related to the sphere of students catering arrangement.

Ministry of Education and Science of the Russian Federation

The Ministry of Education and Science of the Russian Federation along with the subordinate Federal Education and Science Supervision Agency can perform them within the scope of its general functions, for example, by developing the state policy and legal and regulatory legislation in the sphere of education, social support and students social security.

The Federal Service for Consumer Rights Protection and Human Welfare of the Russian Federation is an authorized federal executive body implementing control and supervision in the sphere of people's sanitary and epidemiological welfare provision, consumer rights protection and consumer market. The Federal Service for Consumer Rights Protection and Human Welfare of the Russian Federation possesses the following principal powers in the sphere of public catering:

- controlling and supervising the Russian Federation obligatory legal requirements fulfillment in the sphere of people's sanitary and epidemiological welfare provision, consumer rights protection and consumer market.;
- licensing of other types of activity within the Agency competence;
- informing the state authorities of the Russian Federation, local government bodies and population about the sanitary and epidemiological situation and those measures taken or people's sanitary and epidemiological well-being provision;
- arranging and conducting sanitary and hygienic monitoring;
- auditing activity of legal persons, individual entrepreneurs and citizens related to the sanitary legislation and Russian legislation fulfillment in the sphere of consumer rights protection and rules of particular products sale.

Ministry of Agriculture of the Russian Federation

The Ministry of Agriculture of the Russian Federation is a federal executive body performing functions related to state policy development and legal and regulatory control implementation in the agro-industrial sphere, including animal farming, veterinary, crop production, regulation of the agricultural, raw materials and food markets, food and processing industries, sustainable development of agricultural areas, industrial fishing, which can coordinate the school feeding sphere within the framework of the abovementioned functions.

Within its competence scope, the Ministry of Agriculture of the Russian Federation controls and coordinates the activity of the subordinate Federal Agency for Veterinary and Phytosanitary Supervision.

The Federal Agency for Veterinary and Phytosanitary Supervision is the federal executive body implementing control and supervision in the sphere of veterinary, provision of quality and safety of grain, cereals, compound animal feedstuff as well as components of their production, and performs functions related to people's protection against diseases common for people and animals.

The subject level of the Russian Federation

The regional ministry and department of education

The regional education management bodies of the subjects of the Russian Federation are not legally obliged to manage and control catering arrangement of general education establishments students both on regional and municipal levels. Their functions in this sphere are determined by the Education Law though it does not reflect the specifics of these powers.

It is reflected in a variety of forms and degrees of local bodies' engagement into the issues related to the sphere of students catering arrangement, including development of school feeding programs and proposals as well as food delivery arrangement, placement of orders for students catering arrangement or creation of municipal (regional) school feeding enterprises.

Currently, most regional education management bodies are not directly engaged into managing students catering arrangement at general education establishments. In certain cases, their engagement can be determined by emergency situations occurrence in the sphere of school

feeding arrangement and is implemented by certain measures aimed at eliminating the Russian education legislation violations (by means of forwarding binding prescriptions to education establishments and local government bodies performing management functions in the education management sphere) as well as these prescriptions fulfillment control.

The territorial agency of the Federal Service for Consumer Rights Protection and Human Welfare of the Russian Federation performs main agency functions (i.e. control over production processes safety and school feeding implementation, food products security, their storage and transportation within its jurisdiction) in the subjects of the Russian Federation.

The territorial agency of the Federal Agency for Veterinary and Phytosanitary Supervision performs main agency functions (control over food products security within its jurisdiction) in the subjects of the Russian Federation.

The territorial agency of internal control bodies of the Ministry of Finance of the Russian Federation performs the following functions:

- controlling targeted use of funds allocated by the federal budget and state non-budgetary funds;
- performing documentation auditing and assessing the financial and economic activity of organizations of any property forms under motivated regulations of law enforcement bodies;
- conducting audits and checkups of the Russian subjects and local budgetary funds allocation and distribution;
- controlling duly elimination of violations revealed within the financial and economic activity of those organizations audited by the agency as well as incurred damage compensation.

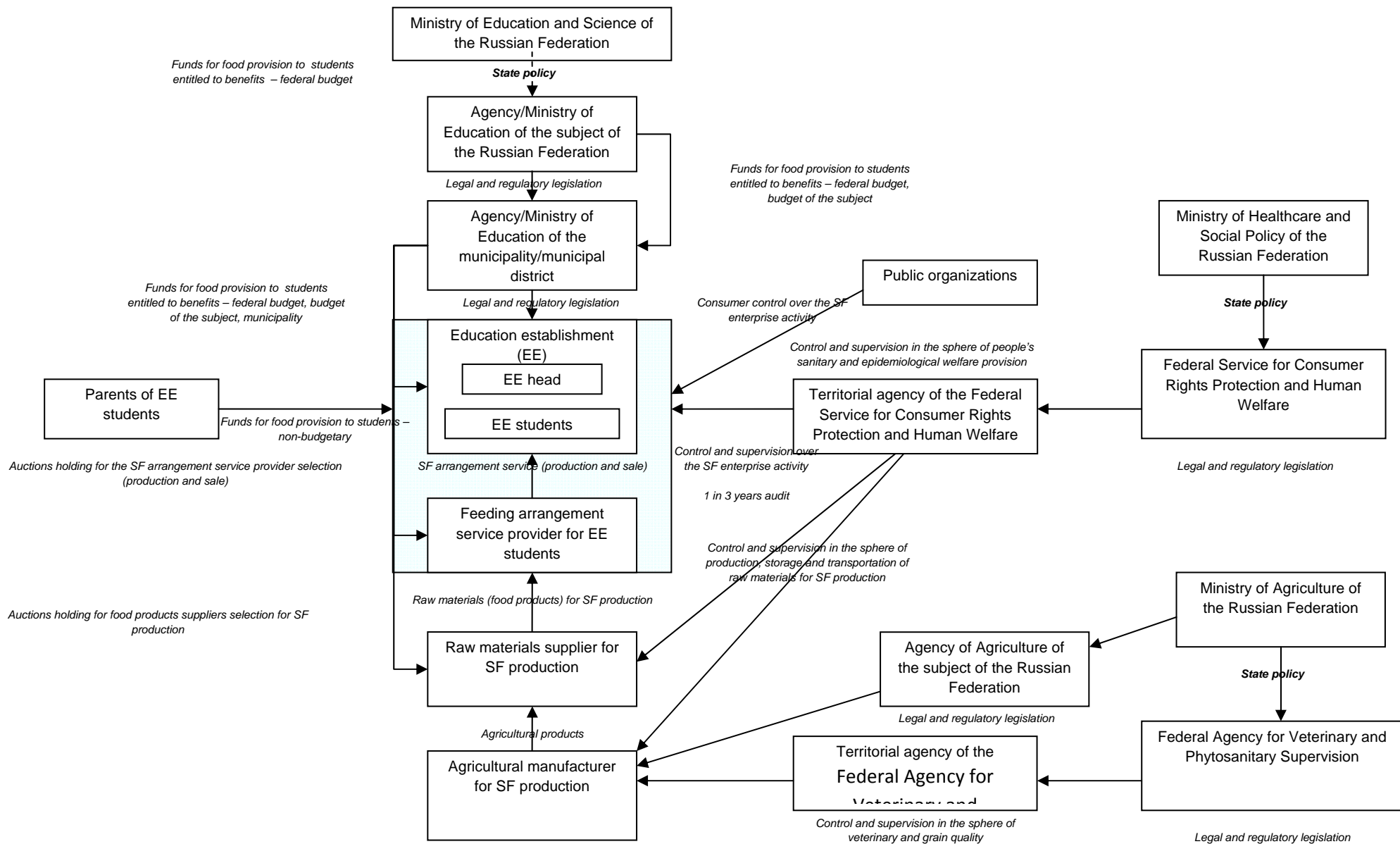


Figure 3 – Principal structure of school feeding system participants

Municipal level

Education municipal management

The municipal education management bodies are not legally provided with any obligations and rights relevant to the sphere of management and control over students catering arrangement at general education establishments; however, being the education establishments founder, the education agency is entitled to implement control over establishments activity, including those operating in the sphere of catering arrangement.

The municipal education management bodies perform the following functions:

- general methodological management of school feeding arrangement at subordinate establishments;
- complex resolution of those issues related to catering funding considering the volume, procedure, forms and terms of the material and technical base improvement, selection of companies dealing with school feeding arrangement and receiving budgetary funds for covering food provision to children entitled to benefits (by means of order placement procedures);
- funding of food provision to children entitled to benefits;
- allocation of financial funds meant for development and enhancement of the material and technical base of general education establishments, compensation of expenses in the catering sphere;
- management of capital assets of those companies operating in the sphere of school feeding system functioning provision;
- coordination of municipal services, district agencies, school canteens operation and development of the single methodology for improving forms and methods of students catering arrangement, food provision, development of the material and technical base of public catering enterprises;
- arrangement of cooperation with internal control bodies.

The general education establishment head performs the following functions:

1. Engagement into arrangement of general education establishments students catering (financial, organizational, management issues: contractors selection, contracts conclusion, engagement into audits, consideration of those provided with food, fundraising for food provision of those children not entitled to benefits). The degree of the general education establishment head engagement is determined by the catering is arranged:

- independent (staff cooks) – the school head is directly engaged into students catering arrangement and resolves financial, organizational, management issues: suppliers search and selection, rations development and approval, price building, assurance of sanitary norms and regulations fulfillment, consideration of those provided with food, fundraising for food provision of those children not entitled to benefits;
- outsourcing (catering arrangement is transferred to an external school feeding arrangement company on a contractual basis): a catering arrangement company selection, engagement into audits, consideration of those provided with food, fundraising for children catering.

The school feeding arrangement company performs the following functions at general education establishments:

- arranging general education establishment students catering, providing fulfillment of necessary sanitary and hygienic norms (production processes and school food products security), school rations requirements (rations makeup, meals amount, product range, nutritional and energy value);
- resolving tasks within the product quality management system (including arrangement of laboratory and other food products research);
- production processes management, planning of school food production and sales;

- management of school food price building (production processes optimization, search for ways of decreasing the school food cost value);
- company personnel management.

The current legislation of the Russian Federation does not provide a full scope of norms governing the powers of the Russian state bodies, state governmental bodies of the subjects of the Russian Federation, local government bodies in the sphere of students catering arrangement at general education establishments.

Therefore, under the legislation, no state governmental level is provided with a structure bearing full responsibility for arranging students catering at education establishments. These functions are partially referred to municipal agencies or education departments (in rare cases – to regional ones). In this case, these structures possess neither sufficient powers for managing (controlling) school feeding arrangement, nor specialized knowledge in the catering arrangement sphere.

Catering arrangement and creation of conditions for operation of public catering organizations subsidiaries is included into the scope of the education establishment obligations. The education establishment head is responsible for catering arrangement and ultimate hot meals provision to students.

The medical personnel along with teachers and managers are responsible for complying with sanitary and hygienic norms, students feeding regime and food quality.

Catering arrangers take full responsibility for ensuring its quality and security.

Therefore, only the school head is currently responsible (under the existing legislation) for completeness, quality and security of food provided to students. In this case, he/she is not furnished with any efficient tools of students catering arrangement management and control.

Market relations development, modification of legal and property forms of education establishments and public catering enterprises have resulted into a necessity of changing school feeding management system and mechanism of its participants cooperation. The school feeding management system modernization implies a single structure creation, whose main components include management bodies possessing clearly defined powers for ensuring efficient, continuous system operation.

3.16.5. Program design

The efficient way of resolving the current problems in the sphere of school feeding arrangement is the special-purpose approach application.

So, the Program for the School Feeding System Modernization at General Education Establishments of the Russian Federation (hereinafter referred to as “the Program”) is currently developed in the Russian Federation.

Taking into consideration the interrelation of the main set tasks with objectives and tasks of priority national projects in the sphere of health, education and agro-industrial complex development, it is reasonable to mark the Program with the Presidential status.

The Program structure includes the following:

1. Program objective and tasks.
2. Catering arrangement at general education establishments and reasoning for its required resolution on the basis of the presidential program.
3. System of framework measures.
4. Mechanism of the Program implementation.

The Program objective implies preserving and enhancing children’s and teenagers’ health by means of providing students of general education establishments with accessible, high quality, safe and well-balanced food products.

The Program main tasks include:

- improving the legal and regulatory framework of the catering sphere at general education establishments as its social catering component;
- improving arrangement, increasing quality and balance as well as ensuring students catering security on a gradual basis;
- increasing state support of students food provision on a beneficial basis;
- achieving the full students coverage with well-balanced hot meals on a gradual basis;
- creating a state funding body for providing beneficial food products to students;
- establishing the state order for delivering food and rendering services of various legal forms to organizations related to students food provision at general education establishments;
- developing the private-public partnership in this sphere;
- developing civic institutions and mechanisms of public control over the students catering status at general education establishments;
- arranging the system of students catering status monitoring at general education establishments;
- improving arrangement, quality control and security of students food provision at general education establishments;
- developing contractual and property relations in this sphere;
- improving the catering system material and technical base at general education establishments;
- further developing social catering production industrialization;
- increasing personnel qualification, ensuring labour safety in catering units of general education establishments;
- developing information technologies and improving automated means of management and control;
- building rational feeding behavior and knowledge about healthy eating foundations by children, teenagers and their parents.

The school feeding system modernization on the federal level should be regarded as the process of fulfilling a task related to building and developing the specialized branch of the Russian economy, providing attraction of social, financial and economic, agricultural and industrial blocks of the Government of the Russian Federation.

The Target Program of the Ministry of Agriculture of the Russian Federation “Food Production Development in the Russian Federation for Organized Groups Food Provision for 2013-2015” is also meant for contributing to school feeding modernization.

The program objective implies modifying the existing system of organized groups food provision by means of introducing modern energy-efficient technologies for well-balanced food rations production at industrial food enterprises.

The program tasks include the following:

- creating modern plants for manufacturing ready-to-eat dishes and prefabricated food products of various readiness state by industrial methods;
- creating production and logistics centres for assembling and delivering food rations;
- launching capacities for manufacturing certain food products characterized by set features at the operational food industrial plants;
- developing food industrial production in property organizations of the Russian subjects and municipal units;
- developing financial and economic, organizational and technological mechanisms contributing to increasing comprehensive food provision to organized groups.

In order to develop proposals related to resolving the issue of students feeding improvement in the sphere of education of the Russian Federation in whole, it is reasonable to conduct complex

research and scientific work considering the problems of catering organization at preschool, general education, specialized, primary, secondary and higher vocational education establishments of the Russian Federation.

3.16.6. Procurement

The average annual demand for food products for all Russian schoolchildren depending on their age groups (7-11 and 11-18 years of age) is given in Table 16.

Table 16

The average annual demand for food products for all Russian schoolchildren

Name of products	Average annual demand for food products for all schoolchildren (breakfast + lunch), tons, thousand l		
	7-11 years	11-18 years	Total
Black (wheat) bread	33,488	80,796	114,284
White bread	51,313	109,670	160,983
Wheat flour	8,262	14,296	22,558
Cereals, legumes	40,178	81,453	121,631
Macaroni products	11,589	23,321	34,910
Potatoes	114,832	236,656	351,488
Fresh vegetables, greens	180,953	335,472	516,425
Fresh fruit	151,141	243,162	394,303
Dried fruit, including briar	8,431	13,904	22,335
Horticultural juices, fortified beverages, including instant ones	41,860	67,330	109,190
1 st category trimmed meat (bone-in meat) and byproducts	58,802	115,156	173,958
2 st category gutted chickens (1 st category gutted fowl)	33,969	63,369	97,338
Fish fillet	20,672	45,411	66,083
Sausage products	3,533	8,488	12,021
Milk (2.5%, 3.2% mass fat fraction)	96,291	177,472	273,763
Cultured milk products (2.5%, 3.2% mass fat fraction)	26,162	42,081	68,243
Cottage cheese (mass fat fraction under 9%)	22,350	39,320	61,670
Cheese	5,839	12,652	18,491
Sour cream (mass fat fraction under 15%)	8,419	15,683	24,102
Butter	17,145	33,643	50,788
Vegetable oil	11,153	20,577	31,730
Dietetic egg	12,753	23,959	36,712
Sugar	35,671	58,849	94,520
Pastry	7,674	12,344	20,018
Tea	227	365	592
Cacao	1,779	2,862	4,641
Bakery yeast	159	255	414

Salt	4,186	9,426	13,612
Industrially produced vegetable marrow paste (for children and teenagers)	11,093	17,843	28,936
Bay leaf	2	4	6
Potato starch	1,221	1,964	3,185
Citric acid	146	242	388
Tomato puree	4,890	11,038	15,928
Bread crumbs	3,205	6,307	9,512
Vanillin	4	7	11

Under Law No 94-FZ d.d. 21/07/2005 on Placement of Order for Products Delivery, Works Performance, Services Provision for State and Municipal Needs”, general education budget establishments are regarded as municipal customers. Delivery of technological equipment, furniture, inventory and utensils is performed upon the auction results. In most cases, placement of orders for the specified products is implemented by specially created local government bodies authorized to perform order placement functions for municipal customers. Such bodies implement functions for municipal customers while municipal customers, i.e. general education establishments, sign up municipal contracts. As a rule, cooperation of general education establishments (schools) and the specified body is implemented according to the following procedure:

- schools forward an application containing a school demand for the specified products to the Agency (Department) of Education of a corresponding local government body;
- the Agency of Education summarizes all schools applications and forms a procurement item as well as requirements to it, which will be further regarded as an integral part of the auction documentation;
- an authorized body forms auction-related documents considering the provided data about a procurement item and requirements to it.

High quality prefabricated food, dishes and culinary products manufacturing by school feeding enterprises should imply application of raw materials complying with the requirements of the current regulatory, technical documentation and safety requirements.

Products delivered to an enterprise should be supported by certain documents submitted by their manufacturer, providing specification of such information as the production date, terms and conditions of products storage. A supporting document should be preserved until a product is sold.

Schoolchildren products listed in Sanitary Regulations and Norms 2.3.2.1078-01 are subject to state registration, upon the results of which a state registration certificate is processed.

In the Russian Federation, there are mainly regional markets of agricultural raw materials and food products delivery to general education establishments. In the subjects of the Russian Federation, the school food manufacturing sphere implies just agricultural and livestock local products application, which allows providing low purchase prices for raw materials and as a result a moderate cost value of finished products. The use of local raw materials has a favourable impact upon the status and level of economic development of the subject of the Russian Federation, its stability, contributes to job growth and unemployment decrease.

3.16.7. Community Participation and Ownership

Public organizations, including parents' committees and the All-Russian public organization "Society for Protection of Education Services Consumer Rights", implement control over operation of enterprises, students catering arrangement, quality of catering, food supply, and the material and technical base status.

Business structures engagement into control and assistance with school feeding arrangement is not provided in all regions. Such traditions have not been established in the Russian Federation yet.

3.16.8. Funding

The average raw materials cost value of breakfast and lunch within the recommended menu for children of 7-11 and 11-18 years of age in the Russian Federation is given in Table 17.

Table 17

The average raw materials cost value of breakfast and lunch within the recommended menu for children of two age groups for 24 days

Meal	Average raw materials cost value for 24 days, rubles	
	7-11 years	11-18 years
Breakfast	16.99	20.13
Lunch	37.15	42.87
Total	54.15	63.00

The price for school food products is formed on the basis of the school food raw materials cost value and single trade mark-up. In accordance with Regulation of the Government of the Russian Federation No 239 d.d. 07/03/1995 on "Measures for Prices (Tariffs) State Regulation", executive bodies of the subjects of the Russian Federation are entitled to manage the trade mark-up of products (goods) sold by catering enterprises by general education schools.

The average price of breakfast and lunch within the recommended menu for children of two age groups is given in Table 18.

Table 18

Average price of breakfast and lunch within the recommended menu for children of two age groups

Meal	Average price, rubles	
	7-11 years	11-18 years
Breakfast	27.18	32.21
Lunch	59.44	68.59
Total	86.62	100.80

Thus, the average school breakfast price with consideration of the average trade mark-up makes up 29.7 rubles, the lunch price – 64 rubles while the average cost of these two meals is equal to 93.7 rubles.

The general annual demand for monetary funds for raw materials and school feeding arrangement makes up 130.6 billion rubles and 209 billion rubles correspondingly.

Under Federal Law No 184-FZ d.d. 06/10/1999 on “General Principles of Arranging Legislative (Representative) and Executive State Government Bodies of the Subjects of the Russian Federation” and Law of the Russian Federation No 3266-1 d.d. 10/07/1992 on Education, financing of food provision to certain categories of students at the expense of the budget of the subjects of the Russian Federation is possible within the framework of the following powers:

- social support of those citizens finding themselves in a difficult life situation as well as orphaned children, street children, children without parents’ guardianship (except for children studying at federal education establishments), families with children (including multi-child families, single parents), low-income citizens;

- full or partial covering of expenses meant for provision for citizens in need for social support, within the study period (categories of citizens are specified by laws of the subjects of the Russian Federation for education establishments within jurisdiction of the subjects of the Russian Federation and municipal education establishments);

- a right to establish additional measures for social support and assistance for certain categories of citizens irrespective of federal laws provisions determining the specified right.

In accordance with Order of the President of the Russian Federation No 431 d.d. 05/05/1992 on “Measures for Social Support of Multi-Child Families”, executive bodies of the subjects of the Russian Federation should provide free food for multi-child families (breakfasts and lunches), i.e. for general education establishment students, at the expense of all students’ funds, production activity deductions and other non-budgetary allocations.

Other special norms determining powers of state bodies of the subjects of the Russian Federation in the sphere of students catering support are not provided by legal and regulatory acts of the Russian Federation.

Covering students catering expenses at general education establishments as well as cost of equipment, utensils and furniture purchase for catering units of general education establishments are not regarded as the direct obligation of state bodies of the subjects of the Russian Federation.

According to Order of the President of the Russian Federation No 431 d.d. 05.05.1992 on “Measures for Social Support of Multi-Child Families”, executive bodies of the subjects of the Russian Federation should provide free food for multi-child families (breakfasts and lunches), i.e. for general education establishment students, at the expense of all students’ funds, production activity deductions and other non-budgetary allocations. Currently, free catering funding provided by Order of the President of the Russian Federation no 431 d.d. 05/05/1992 is implemented within the framework of powers of state bodies of the subjects of the Russian Federation.

In whole, one can draw a conclusion that functions of the federal executive bodies, subjects of the Russian Federation and local government bodies in the sphere of students catering arrangement are still not specified.

Powers of municipal regions and city districts related to education provision arrangement include arrangement of training and education but not their content, including catering services at education establishments. Students catering arrangement does not deal with local issues so students catering financing is not included into the list of expenditure obligations of municipal education.

Local budget financing of corresponding expenses is possible within the framework of providing additional measures of social support and assistance for certain categories of citizens irrespective of federal laws provisions determining the specified right (Paragraph 2, Clause 5, Article 20 of Law on Local Government).

Local government bodies of a municipal region (city district) are entitled to resolve issues not included into the competence of local government bodies of other municipal units, state bodies and not

excluded from their jurisdiction by federal laws and laws of the subjects of the Russian Federation, exclusively at the expense of local budget net profits (except for grants and subsidies provided by the federal budget and budget of the subject of the Russian Federation).

Currently, local budgets provide funds for catering arrangement only for children from low-income and multi-child families. As a rule, students hot meals are paid by parents' funds.

In whole, the school feeding system financing can be improved by the following directions:

- a step-by-step transition to differentiated financing of students catering depending on their belonging to various social groups and hot meals coverage;
- determination of a mechanism for providing required subsidies for school feeding arrangement to certain subjects of the Russian Federation;
- consideration of all actual expenses on school feeding arrangement within the price structure;
- improvement of a mechanism for covering expenses on fixed production assets renewal and current maintenance;
- establishment of a centralized system of school feeding arrangement with the school food production facility as the centre of production and commodity-money flows.

3.16.9. Supplemental Information

General consumption of main foodstuffs in the school and social feeding sector of Russia for 35 million people equals to more than 12 million tons of food and a turnover of agricultural products of more than RUB 650 billion per year.

Considering the consumption in other organized communities in which the nutrition support measures can also be conditionally considered as food aid, the general rates and consumption of food products consist of more than 69 million people (about 50 % of the population), more than 18 million tons of food with a turnover of more than RUR 1 trillion per year.

World experience and especially of the USA shows that the school nutrition and other categories' nutrition is directly linked to agriculture support measures. The US Department of Agriculture runs more than 15 programs for social food aid which concern more than 70 million people. The most important of them are the food coupon program, school nutrition programs and the program for food provision to pregnant women and nursing mothers. The direct food aid for the population is an universal instrument of agriculture development under the WTO and of social support for large parts of the population.

On December 16, 2011 in Geneva in terms of the 8th WTO Ministerial Conference was signed the Protocol of Accession of the Russian Federation to the World Trade Organization (WTO).

Procedurally, Russia is not yet a full WTO Member and probably will not be until mid-summer 2012 (at the earliest). By the terms of Russia's accession, the Russian Duma has until July 23, 2012 to ratify the country's accession agreement. Russia will then become a full WTO member 30 days after its government formally notifies the WTO that it has ratified the deal.

Commitments on Aggregate Measurement of Support (AMS) stipulate that the domestic support level shall amount to 9 billion U.S. dollars (only in terms of the Amber Box) until 2013; this level will allow to implement the Government Program for Agricultural Development and Regulation of Markets of Raw Materials, Agricultural Goods and Foodstuffs for 2008–2012. Later on, within the transitional period it is planned to reduce the domestic support down to 4.4 billion U.S. dollars by 2018 that corresponds to the average level of subsidies to Russian agricultural sector for 2006—2008.

Commitments imply that upon accession to the WTO Russia will not use export subsidies for the agricultural sector (at present no such subsidies are granted).

Russia shall assume the commitment to bind the AMS volume at the level of 4.4 billion U.S. dollars that corresponds to the reference period of 2006–2008. However, immediately upon Russia's accession to the WTO the permitted level of support will amount to 9 billion U.S. dollars which will be gradually reduced down to the bound level of 4.4 billion U.S. dollars (meaning that in practice upon Russia's accession the level of support corresponding to the reference period is not to be reduced, but to be increased).

The terms and conditions of Russia's membership in the WTO also underline the importance of providing food aid to vulnerable parts of the population. According to the WTO these support measures belong to the "green box" and can be applied by the State upon its own discretion and without restrictions. This is what makes such programs an important instrument for the support and development of agriculture and for ensuring the food security of the State.

The terms and conditions of Russia's membership in the WTO require modification by 2018 of the forms and methods of support of the Russian agriculture that relate to the "yellow box". This requires an attentive study and a right implementation of the different forms of food aid for the population while securing these measures by respective actions on agriculture development.

Considerable volumes of the current consumption in social nutrition and in organized communities can be logically completed by providing food aid to other poor and vulnerable parts of Russian Federation's population- to families with multiple children, retirees, handicapped persons, lone mothers etc. This way will be solved not only one of the important social and economic tasks in the area of healthy nutrition of the population and its focused support, but also tasks related to Russia's agriculture development and food security.

It shall be mentioned separately that the Russian food production, especially grain and the products of its processing, that is destined for export in order to secure vulnerable parts of the population in other countries can also be considered as "green box" measures. These steps can be implemented as a part of humanitarian operations within different types of multilateral collaboration and as a part of bilateral food aid programs.

3.17. SINGAPORE

3.17.1. School Feeding Programs

The Health Promotion Board (HPB) cooperates with the Ministry of Education for the purpose of the Healthy School Tuckshop (Canteen) Program implementation. The program is aimed at increasing the accessibility level of more healthy products in school canteens within the complex program involving teachers, parents, suppliers, parents and students.

HPSC serves as a means for healthy eating promotion among students of primary and secondary school. For the purpose of this objective achievement, there is dishes chronology maintained on the school walls, which steps up the program interactivity and is regarded as its integral part.

This program is in line with the existing SFP, i.e. Healthy Eating in School Program (HESP), within the framework of which about 10 main principles of school canteens feeding are described.

This program implies schools being awarded with a special prize. In order to receive the "Healthy Eating in School" prize, all school food providers are assessed by dieticians accredited by HBP for their compliance with 10 principles of HESP:

1. Beverages sold at school on a commercial basis should be marked by the "healthy food" logo. In case of preparing beverages or desserts (e.g. coffee, tea, green bean soup, etc.), the sugar content should be equal to or under 7g/100ml. A beverage should contain no artificial sweeteners (e.g. aspartame). Beverage and dessert preparation should not imply any sweeteners use (e.g. syrup, sugar,

honey). In all vending machines (including those located outside the canteen), only beverages marked by the “healthy food” logo should be sold.

2. Deep fried dishes (e.g. deep-fat frying) and preserves should be sold no more than once per week. Such dishes include deep fried chicken nuggets, breaded chicken patties, sausages, preserved vegetables, etc

3. In case high-fat ingredients (e.g. coconut milk/cream, whole milk, yogurt, cheese, mayonnaise, sour cream) are used for preparing food and beverages, ½ of their amount should be replaced by similar but low-fat ones (skim milk, non-fat condensed milk, light yogurt, light mayonnaise, light cream). No butter, lardon and melted butter should be used for food preparation.

4. Use of skinless meat and poultry.

5. Provision of the recommended amount of vegetables served along with rice and noodles.

6. Provision of at least 2 types of fresh fruit every day.

7. Gravy/sauce/soup can be served only upon students’ request and up to two spoons. This recommendation is referred to rice dishes traditionally served with sauce or gravy.

8. The canteen should be equipped with at least 2 cold water coolers.

9. Sandwiches should be made from coarse floor/whole-wheat bread in the 50/50 ratio (i.e. a sandwich can be made using one slice of white bread and one slice of whole-wheat bread).

10. Limited sale of chips, biscuits, tarts, patties in favour of other snacks marked with a special logo.

In 2009, 87% of the Singapore schools were awarded with this prize.

In case any violations of healthy eating principles are revealed in a school awarded with the “Healthy Eating in School” prize, HBP will consider an issue of it being deprived of this prize.

The healthy food menu includes corresponding proportions of products of four main groups, including rice and its alternatives, meat and its alternatives, fruit and vegetables. For students to receive a certain amount of nutrients required for their growth, the menu is made up on the basis of the main eating principles for children and teenagers. Every canteen provides at least two menu options.

Counteragents engaged into the SFP are offered special culinary master classes and individual consultations with dieticians and professional cooks for the purpose of instructing dishes producers about healthy methods of food preparation. Food providers obtain knowledge in the sphere of healthy food preparation, for example, that of brown rice, and the students’ portion amount.

3.17.2. School Feeding System Status

Currently, school canteens operate within the framework of the Individual Stallholder System (ISS) or Single Tender System (STS).

Within either of these systems, the school is responsible for selection and appointment of contractors on the basis of criteria and procedures established by the Ministry of Education.

In accordance with ISS, contractors are selected on the basis of applications received from particular persons. In case of STS, a contractor is appointed on a competitive basis. As a result, one contractor takes responsibilities for serving all students’ eating places in a school canteen setting prices controlled by the Ministry.

3.17.3. Criteria and Process of Providers Selection

Criteria of providers selection include the following:

- a possibility of providing schools with food and beverages complying with standards set by HPB;

- a possibility of ensuring good services and high food products quality at reasonable prices;
- a high level of hygiene and sanitary norms.

Appointment of new providers at new schools implies the following:

- As a rule, a new school forms a technical specification for counteragents in August, before the new academic year beginning;
- Applications are NOT selected according to the principle “the first to come – the first to be served”;
- Applicants can download a special form on the website of the Customer Service Centre at MOEHQ, North Buona Vista Drive, or that of the Ministry of Education;
- A special committee selects appropriate candidates;
- Potential candidates are invited for interview;
- Successful candidates should get registered and complete the basic course devoted to the food hygiene (WSQ BFHC) and submit an application for obtaining a license (NEA);
- All applicants are informed about their results in November/December.

Schools should conduct monitoring of food and beverage quality in canteens for the purpose of ensuring further compliance with healthy eating habits. Parents can also provide assistance to schools for healthy eating assurance by means of expressing their feedbacks and desires.

3.18. CHINESE TAIPEI

N/A

3.19. THAILAND

The school feeding system in Thailand is described on the basis of the review on the status and issues of SFPs in Thailand⁵⁹. The material will be specified upon the Seminar results.

There are three interconnected and complementary programs implemented within the country:

- School Lunch Programme,
- School Milk Programme,
- Agriculture School Lunch Project.

3.19.1. School Lunch Programme (SLP)

3.19.1.1. Context and aims

The Fund for School Lunch of Primary School Act B.E. 2535 was enacted in 1992, securing annual central government funding for the national SLP (WFP 2007; Jumpatong 2007: 2). The Act states that the aim of the programme is to alleviate nutritional problems among school children. The key concern, especially in the early years, was malnutrition (i.e. underweight). Other aims, as identified by Jumpatong (2007: 1; see also Chittchang 2005), include:

- enhancing food security;
- promoting desirable eating habits;
- promoting full growth and development of children.

⁵⁹ Yoko Kanemasu. Thailand. A desk review of the school feeding programmes, July 2007. WFP.
<http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp207425.pdf>

In addition, there are a number of roles that the SLP may potentially play and that are beginning to attract greater attention. For instance, the Ministry of Education today acknowledges the importance of food education and agricultural activities, which are being integrated into the programme.

3.19.1.2. Target beneficiaries

The SLP is implemented in all public primary schools (approximately 30,000 schools) in grades 1-6 and kindergarten. It targets children suffering from malnutrition and, to a lesser extent, children living in poverty in remote rural areas (Table 19).

Table 19

SLP Beneficiaries

	Oct 97- Mar 98	May-Sep 98	Oct 98- Mar 99	May- Sep 99	Oct 99- Mar 00
Kindergarten	642,628	844,302	687,940	687,943	738,542
Primary school	1,539,235	2,024,565	1,680,793	1,885,864	1,848,662

Source: SRC et al. 2000: 142

The free school lunch entitlement criteria are:

- all malnourished children in schools operating under the Ministry of Education;
- all students at the Border Patrol Police (BPP) schools operating under the BPP Bureau, the Royal Thai Police (which are located in harsher rural conditions with inadequate facilities);
- all students at the Royal-Public Welfare schools;
- economically disadvantaged students (but not all of these children are covered, as described below.) (Chittchang 2005).

About 1.8 million primary school children and nearly 700,000 kindergarten children currently benefit from the programme annually; this is equivalent to about 30 percent of all school children and covers all malnourished school children and about half (48.81 percent in 1998) of the school children living in poverty (Jumpatong 2007:2). The government grant is used by individual schools either to engage private catering services or to purchase foodstuffs, which are cooked at school facilities by teachers, students and community volunteers (especially mothers) taking turns (due to the absence of kitchen staff in schools).

Students in the higher grades often take turns assisting in food preparation, serving, and cleaning (Ibid.: 6). Jumpatong (Ibid.: 4) identifies four modalities of school feeding in the country, three of which involve SLP funding:

- Lunch is provided entirely on the basis of family funding (i.e. students can afford to buy lunch); this is for relatively privileged schools in urban areas;
- Free lunch is provided to poor or underweight children and sold to others; this is for schools in suburban or middle-income communities;
- Free lunch is provided to poor or underweight children. Additional food is given to those who bring only rice from home and sold to those who can afford it; this is for schools in semi-rural areas;
- Free lunch is provided to all students; this is common in schools in remote areas.

3.19.1.3. Funding

Under the 1992 Act, the central government was required to provide US 14 million dollars each year to the Fund for School Lunch of Primary School until a total funding of 6,000 million baht (US\$203 million) was reached. The programme was to be operated on the Fund's interest and the target of 6,000 million baht was reached in

2000. However, due to the lower interest rate and fluctuations in the national economy, an additional budget of about 2,000-3,000 million baht (US\$68-101 million) has been allocated annually by the government (Chittchang 2005; Jumpatong 2007: 2). In a personal interview, Jumpatong (2007) estimated the current additional funding to be around 5,000 million baht (US\$169 million) per year.

The government initially provided 5 baht (US\$0.17) per child per day throughout the 200 days of the school year. This amount was increased following the recommendations of an evaluation study conducted by Mahidol University in 1995 (Chittchang 2005), first to 6 baht (US\$0.20) in 1999 (SRC et al. 2000: 142; CRC 2004:115) and then to 10 baht (US\$0.34) in 2004 (Chittchang 2005; Jumpatong 2007: 2, WFP 2007). In 2007, a budget of over 5,143 million baht (US\$174 million) has been allocated for the programme. The annual programme budget from 2000 to the present is shown in Table 20.

The budgetary allocation – first to LAOs (such as municipalities and tambon administrative organizations) and then to schools – is determined on the basis of the number of children with malnutrition, which in turn is determined by a national growth monitoring system. Teachers in all primary schools since 1986 have carried out weight-for-age growth monitoring (using the Thai standard) and children found to be malnourished by this procedure are entitled to free school lunch (Kachondham et al. 1992). Until around 2003, the provincial primary education supervisor⁶⁰ used these growth-monitoring data for allocating resources to individual schools. Following the decentralization of education management, schools submit these growth-monitoring results in an annual report to LAOs, which then report directly to the central government for budgetary allocation (Ibid.; Jumpatong 2007, personal interview and communication).

Table 20

Annual Budget for the LP

YEAR	KINDERGARTEN		PRIMARY		TOTAL	
	Thai Baht	US\$	Thai Baht	US\$	Thai Baht	US\$
2000	443,125,2	10,198,526	1,103,197,2	25,390,084	3,212,506,2	35,588,610
2000	443,125,2	10,198,526	1,223,058,6	28,148,694	-	38,347,220
2001	494,344,8	11,174,170	1,268,105,4	28,664,254	3,272,054,4	39,838,424
2001	406,015,2	9,177,568	1,103,589	24,945,526	-	34,123,093
2002	871,540,8	20,174,514	2,207,146,8	51,091,255	3,078,687,6	71,265,768

⁶⁰ Provincial education offices have since been replaced by Local Education Areas as part of the education reform of 2004, which decentralized education management to improve outcomes through increased community participation (Jumpatong 2007 personal interview; ADB 2007).

2003	N/A		2,556,091,2	64,498,872	2,556,091,2	64,498,872
2004	N/A		3,394,436,6	87,485,493	3,394,436,6	87,485,493
2005	N/A		5,004,598	122,093,174	5,004,598	122,093,174
2006	N/A		5,279,190	146,237,786	5,279,190	146,237,786
2007	N/A		5,143,944	174,370,964	5,143,944,2	174,370,964
Total	-		-		44,859,435,4	1,250,289,7 24

Note: The Thai fiscal year is from 1 October to 30 September. The budget is allocated twice a year, which is why there are two entries for years beginning in 1995.

Source: Ministry of Education, Thailand, 2007

As for economically disadvantaged children, the central government provides funding to the most deprived provinces on the basis of the provincial poverty index and therefore it does not reach all children in need. Teachers at each school compile the number of children in need of free school lunch for financial reasons, which is reported to LAOs in an annual report, which is in turn reported to the central government for budgetary allocation. The system today is considerably localized; the government funding bypasses provincial governments and is allocated directly to LAOs and then to schools. The system relies primarily on local knowledge – individual teachers’ personal knowledge of their students and their needs – rather than official surveys (Jumpatong 2007, personal interview). According to Jumpatong (Ibid.), this system rests on the fact that most teachers are residents of local communities and that community members enjoy close relations and personal knowledge of each other. While significantly different from formal procedures characteristic of Western bureaucratic systems, this has proven to be suitable and accurate in the Thai context (Ibid.).

Although the central government subsidy does not reach all economically disadvantaged children, LAOs at the local level provide supplementary funding to cater for those who are not covered. Consequently, 95 percent of all school children (including those who can afford to pay and do not receive free lunch) currently have access to lunch every day at school (Jumpatong 2007: 4). The remaining 5 percent may receive free lunch a few days a week, which is due not necessarily to financial constraints but to the problems of access; most of these children are located in remote, hard-to-reach areas, which creates logistical problems for providing meals (Jumpatong 2007, personal interview). This suggests significant progress since 1995, when the Mahidol University evaluation study found that the funding was insufficient and that some schools had to discontinue the service whenever the funding ran out (Chittchang 2005).

3.19.1.4. Governance

The programme has been implemented under the initiative of the Ministry of Education. Since 2001, the Ministry of Interior, which is in charge of provincial and local government, has also been involved as part of the wider decentralization process.⁶¹ The Ministry of Education manages the interest from the Fund for School Lunch of Primary School, whereas LAOs, under the Ministry of Interior, manage the additional central government funding and provide supplementary funding for the cost of free lunch for economically disadvantaged children. At the school level, individual schools

⁶¹ Thailand has undergone some decentralization of power to local governments, which began with the seventh NESDP (1991-1996) and was formally enshrined in the 1997 constitution (World Bank 2007b; Wegelin 2002: 2).

exercise authority over the actual use of the grant and the implementation of the programme. Matters relating to the sourcing, cooking and serving of food are left entirely to individual school policies and initiatives (Jumpatong 2007, personal interview).

3.19.1.5. Procurement

The procurement mechanism of the programme has not been documented in detail. As noted above, the SLP today operates under a decentralized system whereby individual schools are given the authority to determine the procurement method (e.g. where the food is produced, whom to buy it from and how the food is cooked and served) and how to use the subsidy (Ibid.). The purchasing process is informal and does not involve public tenders; there is no formal procurement mechanism or emphasis to promote local sourcing. However, despite this absence of formal policy, local sourcing is a very common practice under the programme. Most schools (estimated to be around 90 percent) purchase perishable food items (such as fresh vegetables and meat) from local producers, often via local markets. A small minority (estimated to be less than 10 percent), mainly in urban areas, engage the services of private catering companies (Ibid.). While local procurement (especially market purchase) may be distinguished from procurement of locally produced food, Jumpatong (2007, personal interview) estimates that most of the food procured is of local provenance. It may be speculated that schools customarily purchase local produce on a regular basis.

In this sense, the programme is implicitly and potentially largely “home-grown.” Jumpatong (Ibid.) explains that local sourcing is a normal practice in Thailand, where the use of imported or transported food in school lunch is almost unheard of given its higher price and the availability of cheaper and fresh local food. Schools may also complement purchased food with student agricultural activities, as described below. Only sauces and seasonings are normally obtained from large manufacturers (Ibid.).

3.19.1.7. Recent initiatives and improvements to the programme

The programme has undergone a number of improvements since its inception in the areas of nutrition, meal quality, education and programme implementation in general. While the initial aim of the programme was to simply feed the target group, it has since broadened to encompass issues such as the improvement of meal quality, school agriculture, food education and community involvement.

3.19.2. School Milk Programme

3.19.2.1. Context and aims

The significance of the School Milk Programme (SMP) needs to be understood in the context of dairy farming in Thailand. The systematic development of the industry began in the 1960s with royal patronage and government support (FAO and APAHCA 2002; Delgado et al. 2003; Itsaranuwat and Robinson 2003; Garcia et al. 2005). The central government, with the aim of developing small-scale production, has been largely instrumental in the growth of the industry by facilitating the import of breeding stocks, providing production subsidies and tariff or quota protection and playing a coordinating role between dairy producer cooperatives and dairy processing companies. The Department of Livestock Development and the state enterprise Dairy Farming Promotion Organization have played a particularly prominent role (Ibid.).

Shielded from international competition and supported with production subsidies, milk production began to boom in the early 1980s (Itsaranuwat and Robinson 2003: 6-7). Dairy farmers – mostly rural smallholders who require assistance in organized milk collection, delivery, processing and technical services – have historically been aggregated into cooperatives, which are today organized under the Ministry of Agriculture and Cooperatives; there were 114 such units in 2001 (Ibid.: 8).

About 95 percent of the raw milk produced by small-scale dairy farmers is collected by these local cooperatives and sold directly to the market or to state-owned and/or private dairy processing companies⁶² (Delgado et al 2003; FAO and APAHCA 2002; Itsaranuwat and Robinson 2003: 6-8; Garcia et al 2005).

Notably, government efforts have been aimed at milk production and consumption. Since 1985, the National Milk Drinking Campaign Board and the National Youth Bureau have conducted a campaign which, with private sector funding, publicized the dietary value of milk under a slogan that is recognized throughout the country today: “Have you had your milk today?” (Itsaranuwat and Robinson 2003: 7). The introduction of the SMP, which specifies that subsidized milk is to be sourced only from domestic production with full contents of Thai raw milk, may be seen as part of the Thai government’s ongoing policy to promote dairy farming.

The National Milk Drinking Campaign Board was established in 1985, following farmers’ protests over unsold milk. It initiated a pilot programme in selected areas of Bangkok and Chiangmai in which the parents of primary school and kindergarten children purchased milk at 25 percent less than the normal price through monthly coupons. Suwanabol (n.d.) notes this as the origin of the national SMP. The programme officially started in 1992 to provide 200 ml of free milk to all first-year kindergarten children (Chittchang 2005; Suwanabol n.d.). In 1995, it was expanded to cover all children up to Grade 1 in public schools. Since 2005, 200 ml of free milk, costing 5 baht (US\$0.17), is provided in the morning to all public kindergarten children and students in Grades 1-4 in all public primary schools for the 200-250 days of the school year (Chittchang 2005; UNESCO Bangkok n.d.; SRC et al. 2000: 143; Jumpatong 2007, personal communication). The programme is expected to cover up to Grade 6 eventually. As of 2005, 6.09 million children benefited from the programme (see table below).⁶³

The available information suggests that the SMP has two key aims. First, like the SLP, the programme promotes healthy growth of young children and milk was selected as a supplementary drink for its dietary value (Chittchang 2005; Jumpatong 2007, personal interview and communication). As a related goal, the programme is also intended to improve school attendance with the offer of free milk (Itsaranuwat and Robinson 2003: 7; Jumpatong 2007, personal interviews and communication). The programme also has a key function of supporting the dairy industry and the livelihoods of dairy farmers.

The SMP provides an outlet for the produce and further contributes to creating a future market by encouraging children to develop a taste for milk from an early age (Suwanabol n.d.; FAO and APHCA 2002; Delgado et al. 2003). Recently, the programme has sought to maximize the involvement of local farmers’ cooperatives, thereby enhancing its rural development potential. Therefore, it may be said that the SMP has goals of promoting nutrition and health, dairy farming and rural development.

⁶² The other 5 percent is sold to local middlemen who tend to offer slightly higher prices (Delgado et al 2003).

⁶³ Supplementary milk is also provided by other government agencies such as the BMA, the Department of Local Administration, BPP Command and young child development centres under the Department of Community Development (SRC et al. 2000: 143).

3.19.2.2. Funding and governance

The programme was initially implemented by the Ministry of Education, but has since been decentralized and administered by LAOs under the Ministry of Interior (Jumpatong 2007, personal interview). The central government budget is directly allocated, though LAOs, to individual schools which purchase their own milk. The Ministry of Education continues to monitor the programme implementation, whereas the Ministry of Agriculture and Cooperatives oversees the milk supply (Ibid.). The annual budget, beneficiaries, grades and the number of school days covered by the programme from its inception in 1992 to 2003 are shown in Table 21.

Table 21

SMP Annual Budget, Beneficiaries, Grades and Number of School Days Covered

FISCAL YEAR	GRADE	No. OF STUDENTS	No. OF DAYS PROVIDED	BUDGET	
				Thai Baht	US\$
1992	Kindergarten	696,625	120	278,600,000	10,912,651
1993	Kindergarten	1,267,199	120	423,800,000	16,567,613
1994	Kindergarten	1,623,683	200	1,207,600,000	48,101,969
1995	K – Grade 1	2,802,612	200	1,715,000,000	68,055,488
1996	K – Grade 2	3,518,192	200	2,213,200,000	86,284,700
1997	K – Grade 3	5,010,776	200	4,334,770,000	92,623,198
1998	K – Grade 4	5,389,842	200	5,323,750,000	145,856,376
1999	K – Grade 4	5,841,732	200	5,356,430,000	141,892,366
2000	K – Grade 4	5,905,000	200	5,981,350,000	137,660,770
2001	K – Grade 4	6,224,752	200	6,070,190,000	137,210,575
2002	K – Grade 4	5,836,286	230	6,752,350,000	156,304,073
2003	K – Grade 4	5,961,373	230	6,819,030,000	172,067,312

Note: In 2001, Grade 5 and 6 students with malnutrition problems were included.

Source: Jumpatong 2007, personal communication

3.19.2.3. Procurement

The procurement mechanism of the programme, like that of the SLP, is scarcely documented. Nevertheless, it appears that it has undergone some significant changes in recent years (Ibid.). In the last decade, purchasing of school milk was administered at the provincial level by the provincial educational office. Due to the lack of efficiency and accountability in this system, the procurement policy was subsequently changed to allow individual schools to take responsibility for purchasing milk for themselves, according to the programme guidelines. These guidelines required schools to purchase milk from the nearest producers, whether or not they were situated in the same province, and to give priority to local farmers' cooperatives or agricultural colleges. This policy has since been refined in order to prevent intense competition where large cooperatives and companies tend to have a significant advantage over small cooperatives.

Under the current system, the country is divided into three school milk zones. The consumers (i.e. children) and the suppliers of milk must be within the same zone (e.g. raw milk in zone 1 must be processed by a dairy in zone 1 and be consumed by schools in zone 1). This zoning is intended to ensure a balance of supply and demand and a more equitable allocation of resources. Dairies wishing to be a school milk supplier must first be certified by the Ministry of Industry, possess a valid food safety certificate from the Thai Food and Drug Administration and have a long-term contract to buy local raw milk. By 2004, all school milk suppliers must be HACCP (Hazard Analysis and Critical Control Points) certified. All school milk must be made from liquid raw milk and not from powder (Suwanabol n.d.; Jumpatong 2007 personal interview and communication).

In contrast to the SLP, the SMP has an explicit emphasis on local procurement and, more specifically, on procurement of local produce. If the SLP is an implicitly “home- grown” programme with informal procurement practices, the SMP may be described as an explicitly “home-grown” programme supported with a formal procurement mechanism and policy. Such an explicit emphasis on local sourcing may not have been a feature of the programme in the past; at least one writer commented in 2003 that local dairy cooperatives played a minimum role in the SMP because most of the milk was procured from “the politically-based business firms in Bangkok” (Delgado et al 2003).

3.19.2.4. Impact

The impact of the SMP on national milk consumption and production is notable. The annual per capita milk consumption increased from 2 litres in 1984 to 23 litres in 2002; the dairy market similarly expanded from 290 million litres a year in the early 1990s to 1,146 million litres by 2003. Local herd size also grew from 132,000 in 1989 to 412,000 in 2003 (Suwanabol n.d.; see also Garcia et al 2005: 1). Delgado et al. (2003) suggests that the growth of the industry between 1993 and 1995 is largely attributable to the programme. School milk accounted for more than 30 percent of the total liquid milk market around 2003 and the share has grown since then to about 50 percent (Ibid.; Suwanabol n.d). In short, as Itsaranuwat and Robinson (2003: 7) note, the SMP has “played a key part in promoting milk consumption across the whole country.” This has positive implications for the livelihoods of small- scale farmers, who make up the majority of the milk producers in Thailand, especially under the current procurement policy favouring local cooperatives. Although no empirical data are available to demonstrate the scale of the impact, a Ministry of Education official confirms that farmers’ cooperatives currently constitute the largest proportion of school milk suppliers (Jumpatong 2007, personal interview).

3.19.3. HRH Princess Maha Chakri Sirindhorn’s Agriculture For School Lunch Project

Thailand currently operates one other major school feeding programme. Although it is more or less supplementary in nature, it has a longer history and is implemented in conjunction with the SLP and the SMP in many remote rural schools. Its contribution warrants brief attention.

In 1980, Her Royal Highness (HRH) Princess Maha Chakri Sirindhorn initiated the Agriculture for School Lunch Project with the aim of alleviating food insecurity and malnutrition among school children in remote rural areas. The project has been implemented in almost every BPP school in combination with the SLP and the SMP. In 2004, it was extended to secondary schools and today it targets 478 schools (Table 22).

The project encourages school agriculture in order to improve the quality and frequency of school lunch in remote rural areas. Under the project, HRH provides agricultural materials and tools, plant seeds, animal breeds, cooking utensils, technical training and budgetary and other assistance to facilitate and promote agricultural activities (i.e. crop and animal husbandry) by students as part of the

curriculum (Ibid.).⁶⁴ The project is a food security measure and also has an educational emphasis, as it aims to equip students with agricultural skills and knowledge to be transferred to their families and used in their future careers. Most BPP school students come from remote farming communities in which such training is likely to be of value (Viravat 2007, personal interview).

Table 22

Number of participants in 2004

Toddler	436
Preschool	17,130
Primary	44,853
Secondary	5,970
Islam	888
Novice	1,720
Total	70,997

The produce from students' agricultural activities is sold to the school cooperative shop and then cooked by parents, students and teachers according to the nutritional guidelines of the project (WFP 2007). The school cooperative purchases the food with the 10 baht-per-child grant (US\$0.34) available from the SLP. The grant thus operates as a kind of revolving fund, circulating in the school. It has an additional benefit of giving students an opportunity for training in convening cooperative committees, debate and bookkeeping. If schools do not produce sufficient food, additional foodstuffs are obtained through community donation or market purchase. Prior to 1992, BPP schools received assistance only from this project. With the introduction of the national SLP and SMP, however, the combination of the three programmes has served to guarantee good quality meals for school children in remote rural areas (Ibid.; Viravat 2007, personal interview).

Community participation is a key element of the project. Children, teachers, parents and other community members cooperate in agricultural activities and meal preparation, which serves to strengthen community networks and cohesion. Schools are envisaged as "learning centres" where community members, along with students and teachers, acquire new agricultural and hygienic skills and knowledge (Ibid.).

The key activity components of the project include:

- school agriculture, by using integrated agricultural techniques;
- meal preparation with the assistance of mothers and community members
- taking turns under teachers' supervision;
- promotion of food preservation;
- provision of iodized drinking water;
- periodical nutritional surveillance (e.g. weight and height measurement and goitre examination);
- deworming;

⁶⁴ In some cases in which agricultural activities are not possible (e.g. in child development centres and monastic schools), the Princess provides funding for purchasing foodstuffs and powdered cow milk or powdered soy bean milk as supplementary food (WFP 2007).

- teacher training in agriculture and nutrition;
- student training in agricultural techniques (e.g. meal preparation, healthy eating and sanitation);
- continuous monitoring and evaluation by concerned agencies.

Despite its longer history, the project covers more limited areas and schools than the SLP and the SMP and plays a supplementary role. Its role in local procurement is rather limited because the food used to prepare the meals is produced by students themselves. When additional foodstuffs are purchased, they are usually sourced from markets in towns some distance away from the BPP schools which are mostly located in remote, mountainous areas (Viravat 2007, personal interview). The significance of the project lies primarily in its nutritional, food security and educational benefits to rural school children rather than in immediate socio- economic benefits to local farmers.

3.19.4. Conclusions

On the basis of the limited information available for this case study, it is possible to make the following observations about the potential and challenges for the SLP and the SMP, especially in relation to their “home- grown” elements:

1. The SLP was established and has thus far been implemented with aims specifically related to health and nutrition. Its scope is expected to broaden and diversify in the future, as the emphasis shifts toward quality and the wider educational and socio-cultural potential of school feeding.

2. Despite the absence of a clear procurement policy or mechanism, the SLP is (possibly largely) “home-grown” in practice. This implies the potential for strengthening and improving current practice and a challenge to facilitate the home-grown aspect through appropriate institutional, technical and policy support.

3. Although it has undergone significant improvement, the SLP, as a considerably localized programme, continues to face budgetary restrictions, the need for appropriate infrastructural, technical and personnel support and clear national and local government policy.

4. The SMP, in contrast to the SLP, has operated with two objectives: promoting health and nutrition and supporting dairy farming. Although the available information suggests that the emphasis until recently was on the procurement of national, rather than specifically local, produce, the current policy indicates a clear intention to encourage greater involvement of local milk producers, implying significant “home-grown” elements.

5. Despite such existing and potential home-grown elements, the scarcity of empirical data does not permit a valid understanding or measurement of the precise impact of the SLP and the SMP on small-scale local producers. A better understanding of the actual procurement practices and their impact on local producers and rural economies requires further research, especially substantial field work.

3.20. USA

3.20.1. Major food assistance programs

USDA administers five major domestic food assistance programs that exclusively or primarily serve the nutritional needs of children⁶⁵:

⁶⁵ <http://www.ers.usda.gov/Briefing/ChildNutrition/>

- National School Lunch Program
- School Breakfast Program
- Child and Adult Care Food Program
- Summer Food Service Program
- Fresh Fruit and Vegetable Program.

The child nutrition programs work individually and in concert to provide a nutritional safety net for children and together account for one-quarter of USDA's domestic food and nutrition assistance outlays.

In fiscal 2010, USDA spent \$17 billion on these programs.

The National School Lunch Program (NSLP) is the Nation's second largest food and nutrition assistance program. In 2010, it operated in over 101,000 public and nonprofit private schools (grades K-12) and residential child care institutions. The NSLP provided low-cost or free lunches to over 31.6 million children daily at a cost of \$10.5 billion.

Any student in a participating school can get an NSLP lunch regardless of the student's household income. Eligible students can receive free or reduced-price lunches:

- Free lunches are available to children in households with incomes at or below 130 percent of poverty
- Reduced-price lunches are available to children in households with incomes between 130 and 185 percent of poverty.

In 2010, school cafeterias served more than 5 billion lunches, more than half of them free or at a reduced price. ERS-sponsored research found that children from food-insecure and marginally secure households were more likely to eat school meals and received more of their food and nutrient intake from school meals than did other children.

The School Breakfast Program (SBP), founded by the Child Nutrition Act of 1966, provides nutritious meals to students at participating schools (and to children in a few residential child care institutions). Eligible students receive free or reduced-price breakfasts.

The number of schools participating in the SBP increased dramatically in the early 1990s, growing by nearly 9 percent annually between fiscal 1989 and fiscal 1995. Since then, the number of participating schools has continued to increase, although participation still lags that of the NSLP (with more than 101,000 schools and residential child care institutions participating). In 2010, 88,642 schools and residential child care institutions participated in the SBP, up from 87,814 in 2009.

Student participation in the SBP has also grown. In fiscal 1989, 3.7 million students participated in the program on a given school day, and a total of 658 million breakfasts were served. In fiscal 2010, 11.6 million students participated in the program daily, 5 percent more than the previous year. Most participants have high need; of the 1.9 billion breakfasts served, 75 percent were free and another 9 percent were provided at reduced price. Spending for the program totaled \$2.8 billion in 2010, 10 percent more than in the previous year.

The Child and Adult Care Food Program (CACFP), as part of the changes required by Congressional reauthorization of the program in 2010, will be allowed to provide suppers to children attending after-school programs in high-need areas, where at least 50 percent of children are eligible for free or reduced-price meals. In addition, reauthorizing legislation requires USDA's Food and Nutrition Service (FNS) to develop new nutrition standards for CACFP meals and snacks that better reflect current Federal dietary guidance.

The Summer Food Service Program (SFSP) in 2010 provided meals to 2.3 million children each day at 38,471 sites during the program's peak month of July. SFSP served almost 134 million meals and snacks at a cost to USDA of almost \$359 million in fiscal 2010, primarily during summer vacation.

The USDA Fresh Fruit and Vegetable Program makes fruit and vegetable snacks available at no cost to all children in participating schools. The program began in 2002 as a pilot program in a small number of schools. It has since become a permanent program that was expanded to cover selected schools in all 50 States, as part of the 2008 Farm Bill.

The Nutrition Programs Title of the 2002 Farm Act provided \$6 million for USDA to award to schools through a Fruit and Vegetable Pilot Program (FVPP) for the 2002-03 school year. The 2004 Child Nutrition and WIC Reauthorization Act made the Fruit and Vegetable Pilot Program permanent and expanded it to more States. The 2008 Farm Bill expanded it to all States, along with the District of Columbia, Guam, Puerto Rico, and the Virgin Islands. However, it is available in selected schools in each State based on need—schools in which a high proportion of students are eligible to receive free or reduced-price school meals. The current Fresh Fruit and Vegetable Program is administered by USDA's Food and Nutrition Service (FNS).

USDA provides after-school snacks to school children through either its National School Lunch Program (NSLP) or the Child and Adult Care Food Program (CACFP).

In addition to serving NSLP lunches, schools can offer nutritious snacks as part of after-care educational programs or enrichment activities. Snacks are subsidized on a sliding scale, based on whether students qualify for free, reduced-price, or full-price lunches. Schools in which at least 50 percent of students qualify for free or reduced-price meals are “area eligible” and fully subsidized for all participating students. Participation in the NSLP After-School Snack Program—authorized by Congress in 1998—although smaller than lunch and breakfast program participation, is growing. The program reached an average of 1.3 million snacks served daily in fiscal year (FY) 2010 and over 219 million snacks served that year. Almost all snacks were served in high-need area eligible schools.

Through USDA's Child and Adult Care Food Program (CACFP), after-school snacks can be served by third-party sponsors of community-based after-school enrichment programs in those areas, where at least 50 percent of the children are eligible for free and reduced-price meals. Beginning in 2000, some State CACFP programs were given the option to offer after-school suppers through community programs in these at-risk areas. In December 2010, Congress extended this option to all of the States. Through this option, community programs may also serve breakfast or lunch on weekends, holidays, and school breaks, addressing gaps that may occur when at-risk children are not in school.

3.20.2. Social Protection System for Vulnerable Groups of Children

Free school lunches or lunches at preferential prices can be served by any public or nonprofit private school, or preschool establishment providing that the following key requirements are observed: nondiscrimination, food security rules observance, students provision with dishes complying with healthcare norms.

The federal and state government allocates necessary funds and food surplus to schools engaged into the program. Due to NSLP, some 30 million of children in the USA receive school lunches on a free or preferential basis, which allows providing children from low-income families with nutritional food.

The federal incomes regulations help to determine who can apply for a free school lunch or lunch at a preferential price. Children from families provided with federal or state food support are entitled to receive free school lunches.

Free school lunches are available for children from families, whose income does not exceed 130% of the poverty level. Lunches at preferential prices can be provided to children from families, whose income makes up 130-185% of the poverty level. Children from families, whose income is over 185%, pay the full price for their lunch; nevertheless, their meals are partially sponsored by the federal budget. Local authorities can set their own prices for lunches providing that their feeding programs are of nonprofit character. (18)

The federal incomes regulations are changed every year. For example, for the period from July 1, 2001 till June 30, 2012, 130% of the poverty level makes up 29,055 dollars for a four-member family, 185% - 41,348 dollars. In 2009-2010, the similar indicators made up 28,665 and 40,793 dollars correspondingly. (12)

3.20.3. Food Provision Management

Purchase, distribution and processing of food products necessary for SFP require certain decisions on the federal and regional levels, on the level of school districts and coordinators of the school food distribution system.

The Department of Agriculture initially determines what food products should be purchased from producers on the federal level defining their types, amount and other characteristics. Besides, the Department of Agriculture can purchase already processed products on the federal level.

The next step implies a resolution adopted by the state authorities responsible for food products distribution related to the fact what products included into the list provided by the Department of Agriculture should be supplied to state schools on the basis of school districts' orders and/or their own preferences.

On the local level, food products are ordered to the amount allocated by the federal government; besides, a decision related to their further processing and final product characteristics is made.

Under the federal legislation, schools cannot specify particular dishes or their amount in their orders but should define what food products and in what amount are to be ordered, their processing method, what companies can act as partners and what products and in what amount are to be ordered from them. Besides, schools can set standards in the sphere of energy value and requirements to final products.

Companies dealing with school food production or distribution can also make decisions related to offered food products considering such factors as market demand, potential profit and expenses. (3)

3.20.4. National Standards and Dietary Guidelines

In the USA, the Dietary Guidelines for Americans are developed by the Department of Agriculture along with the Department of Healthcare and Social Security. The guidelines are updated once in five years providing further publication of new provisions containing reliable information for the American citizens of over 2 years of age related to the fact how to considerably decrease the calorie intake, choose products correctly and lead an active lifestyle for achieving and maintaining the normal weight, reducing risks of chronic diseases as well as health preservation in whole.

It was January 31, 2011 that the Dietary Guidelines for Americans were last updated. Due to the fact that one third and over two thirds of the US grown-up population suffer from overweight or obesity, the Guidelines seventh revision emphasizes the ration energy value reduction and physical activity increase. (5)

In 2011, the “My Pyramid” Dietary Guidelines for Americans were replaced by the system called “My Plate”.

The key system provisions can be represented by 10 principles (17): observe the daily calorie intake; eat less trying to enjoy your food; eat by small portions; consume the following products more frequently (vegetables, fruit, whole-wheat products, skim milk or low-fat milk (1%), dairy products); switch to skim milk or low-fat milk (1%); make sure that one half of all consumed cereals should account for whole-wheat products; consume unhealthy products more seldom; control the sodium content in products; drink water instead of sugar-containing beverages.

3.20.5. Food Products Security

The state authorities set food security standards, conduct inspections for food products compliance with the established standards, ensure enforcement of regulations.

January 4, 2011, the US president, Barak Obama signed up the law extending the state powers in respect of food security control (Food Safety Modernization Act). This law allows the Food and Drugs Administration to provide extremely efficient public health protection due to the food security system enhancement. Therefore, the department can focus not only on overcoming consequences of food security problems but also preventing their occurrence. (16)

Besides, the Food and Drugs Administration is now entitled to prohibit distribution of food not complying with the food security criteria by refusing to register a certain food enterprise. It is noteworthy that an enterprise may encounter problems with registration not only in case its manufactured products pose a threat to people’s health but also if this enterprise does not take any measures for protecting consumers against unhealthy products and shutting down the line. A manufacturer of poor quality products should also study the causes of this controversial situation and take appropriate measures in order to avoid its reoccurrence. In case a manufacturer does not comply with this task, the situation should be resolved by the Food and Drugs Administration. (8)

It is also noteworthy that in 2010 the US Department of Agriculture has cracked down on companies supplying food products to schools. The implemented measures are aimed at checking existing suppliers’ products and assessing potential risks before food-borne diseases have occurred and spread. (22)

3.20.6. Expenses, Prices, Financing

SFP food production expenses have considerably increased. The average costs of SFP food production are given in Table 23. (14)

Table 23

The average costs of SFP food production

	Average figure	Range
Food production expenses (2007-2008 academic year)	2.63\$	1.15\$ - 3.72\$
Food production expenses (2008-2009 academic year)	2.90\$	1.50\$ - 3.87\$
Food production expenses growth	Expenses increased by 0.27\$	The expenses growth made up 0.03\$ - 0.75\$

73 % of SFPs increased food prices for students paying the full cost of dishes to make up for costs caused by the food production expenses growth. The average food prices for students paying the full cost of dishes are given in Table 24. (14)

Table 24

Cost of dishes

	Primary school	Secondary school (5-8 grades)	High school (9-12 grades)
2007/08 Food prices	1.74\$	2.02\$	2.11\$
2008/09 Food prices	1.86\$	2.16\$	2.23\$

Prices of breakfasts (under the School Breakfast Program - SBP) and lunches (under the National School Lunch Program) in 2009/2010 academic year (Table 25). (1)

December 13, 2010, the US president, Barak Obama, signed up a new law governing children feeding at schools (Healthy, Hunger-Free Kids Act). According to the document, it is necessary to increase the amount of children exercising an access to SFPs and to improve the provided food quality, which will allow resolving issues of hunger and obesity.

Due to this law, more fresh fruit and vegetables appeared in school canteens while the provided milk is represented by skim or low-fat milk. Besides, it is planned to set a single lunch price of 2.46\$ in all schools. However, different states still pursue different price policies. For example, in Fairfax district, Virginia, the lunch price at primary school makes up 2.65\$ while at secondary school – 2.75\$, though in Austin, Texas, the lunch price makes up 2.15\$ and 2.50\$ correspondingly. (20)

Table 25

Prices of breakfasts and lunches

School		Breakfast (SBP)	Lunch (NSLP)
Primary	Full price	1.00\$	1.70\$
	Preferential price	0\$	0.40\$
	Second helping	1.65\$	3.25\$
	Milk	0.50\$	0.50\$
Secondary	Full price	1.40\$	2.00\$
	Preferential price	0\$	0.40\$
	Second helping	1.65\$	3.50\$
	Milk	0.50\$	0.50\$

In 2010, federal funds allocated for SFPs financial support were distributed in the following way: 70.9% of the total amount was allocated to school lunch and snack programs, 20.8% - to SBP, 8.2% - to food products purchased at extra charge and less than 1% - to school milk programs. (10)

For SFP at a particular school to be federally supported, local school district should obtain a permit issued by the State Department of Education. In case a permit is provided, all public and nonprofit private schools in the district can be engaged into the program. In order to launch the program on a district or school level, one should select a competent body (an independent nonprofit organization) that would provide food supply under SFPs as well as determine what students and in what quality can participate in the program.

The Food and Nutrition Service (FNS) by the US Department of Agriculture deals with distribution of SFPs grants among states based on the amount of dishes of each category provided by a particular state within the previous budget year (free lunches, lunches at a preferential price, full price lunches as well as milk, snacks, and breakfasts) multiplied by the federal subsidy rate for each type of dishes. In order to provide SFPs federal funding, states should allocate for SFPs funds in the amount of 30% of the total volume of federal support received in 1980 (Table 26). (19)

Table 26

Federal SFPs expenses, million \$

Federal SFPs expenses, million \$								
(As of December 1, 20011)								
Budget year	Allocated monetary funds				Related expenses			Total federal expenses
	National School Lunch Program	School Breakfast Program	Milk Program	Total	Established norm	Extra	Total	
1997	4,934.1	1,214.3	17.4	6,165.8	590.9	28.8	619.7	6,785.4
1998	5,101.6	1,272.2	16.8	6,390.6	642.5	85.7	728.2	7,118.8
1999	5,314.5	1,345.5	16.5	6,676.5	661.1	43.8	704.9	7,381.4
2000	5,492.9	1,393.3	15.4	6,901.6	606.6	48.6	655.2	7,556.8
2001	5,612.3	1,450.1	15.5	7,078.0	802.2	60.6	862.8	7,940.8
2002	6,049.6	1,566.7	16.1	7,632.3	720.6	82.6	803.3	8,435.6
2003	6,340.6	1,651.8	14.3	8,006.7	696.9	151.7	848.7	8,855.3
2004	6,663.1	1,775.8	14.2	8,453.1	762.5	200.5	963.0	9,416.1
2005	7,055.3	1,927.2	16.4	8,998.9	824.0	151.1	975.1	9,974.0
2006	7,387.9	2,041.9	14.6	9,444.4	772.9	29.4	802.3	10,246.7
2007	7,706.1	2,163.5	13.6	9,883.2	1,017.0	16.2	1,033.2	10,916.4
2008	8,265.0	2,365.6	14.9	10,645.4	1,034.0	18.5	1,052.5	11,697.9
2009	8,873.0	2,582.5	14.0	11,469.5	933.7	185.4	1,119.1	12,588.5
2010	9,750.3	2,859.2	11.9	12,621.4	1,044.1	83.8	1,127.9	13,749.3
2011	10,062.8	3,018.1	12.3	13,093.2	1,035.2	163.8	1,198.9	14,292.2
Data for 2011 are based on a preliminary assessment and should be checked.								

3.21. VIET NAM

3.21.1. School Feeding System

Viet Nam lacks a single school feeding program. There are separate SFPs developed by regions. They operate mostly due to support of the government and various non-governmental organizations.

School lunches programs (within the framework of which students usually have their daily meal) are valid only in urban and few rural schools. However, these programs are funded not by the state budget but by parents. In case a family cannot afford to pay for lunch, it is not provided. The average lunch includes soup, set of vegetables, tofu or fish. As a rule, there are four or five options; besides, pickled eggplants or hardboiled eggs can be offered. The set of products varies on a daily basis. The average lunch cost makes up 18,000 dongs (86 US cents).

From the social point of view, the main SFP objective implies combating malnutrition and underweight among children. Therefore the Vietnamese SFP focuses on low-income social groups support.

USD 3.55 million was allocated for the 2010-2012 “Integrated Nutrition and Food Security Strategies for Children and Vulnerable Groups in Vietnam” program implementation.

The UN special bodies (WHO, UNICEF and FAO) provide support to the Department of Maternal and Child Healthcare and National Food Service Institute within the framework of the “Integrated Nutrition and Food Security Strategies for Children and Vulnerable Groups in Viet Nam” program implementation.

For three years (2010-2012), the UN has been offering assistance to the Vietnamese government for resolving an issue of constant malnutrition of the most vulnerable social groups focusing on combating growth retardation and malnutrition. The program is oriented at a certain group of provinces with a high level of growth retardation. The selection is also based on local capacities for the program measures implementation.

Along with short-term perspectives, the program includes certain long-term strategies related to feeding quality improvement by means of increasing accessibility and quality of crops and products of animal origins (meat, milk and fish).

The program principal tasks include:

- 1) improvement of systems for products quality monitoring, increase of maternal and children nutrition quality as a landmark of the feeding environment state;
- 2) improvement of babies and schoolchildren nutrition;
- 3) mineral nutrients shortage decrease for the target group of children and women;
- 4) improvement of care and treatment for children suffering from malnutrition and children nutrition quality increase in emergency situations.

The state implements the “School Milk” program but currently only in Vung Tau province. Milk deliveries are funded by the province budget. Since 2011, the “School Milk” national program was to be carried out with partial employment of parents’ resources. It is assumed that the program will cover not only schoolchildren (220-250 ml of milk 3-5 times per week, 9 months per year) but also preschoolers (110-120 ml of milk 1-2 times per week, 12 months per year).

3.21.2. Food Products Quality Management

For the purpose of providing consulting assistance to the Ministry of Healthcare in respect of issues of food products quality management, hygiene and safety, the Department of Food Products Quality Management was created in 1999. The Department of Food Products Quality Management controls nutrition hygiene, safety and food products quality.

The Department tasks include the following:

- development of food products standards and safety rules coordination;

- food products testing;
- audit and licensing of joint enterprises;
- investigation of food intoxication outbreaks as well as cooperation with preventive healthcare centres and medical teams in respect of preventive measures implementation.

3.21.3. Third Party Organizations Engagement

“Love Education” fund. The Vietnamese families launched the school lunches program for poor children at the Tan Liang primary school that cannot go home for lunch. Some of them suffer from malnutrition, which affects their ability to take advantage of the learning process. Their lunch used to include rice and a small amount of vegetables. Due to the shortage of proteins and very restricted nutrition, these children were characterized by growth retardation and in some cases even the extreme degree of malnutrition.

“Food for Thought” fund. At the moment, the fund implements the “Food for Thought” program enabling to provide poor children with school meals, which means energy and health required for studying. Under this program, students are supplied with a school lunch consisting of proteins (meat and an egg), a yogurt, rice, vegetables and fruit. Its monthly cost makes up \$14 for one child.

3.21.4. Humanitarian Organizations Support

Currently, there is the Pediatric Nutritional Supplement Program carried out in Viet Nam. The program encompasses primary schools, whose teachers are informed about the efficient nutrition foundations, instructed how to use local resources for supporting the food ration required for children.

The Pediatric Nutritional Supplement Program was launched in 2004 as a local initiative represented by the GIAO Diem Fund for Humanitarian Studies. This program involved 379 preschoolers from 35 kindergartens located in distant rural areas. Children received a daily nutritional supplement, including soymilk with peanuts or biscuits, or sweet rice with soya-corn blend as well as chewable multivitamins and calcium.

In 2006, AmeriCares jointly with Abbott and Abbott Fund provided support to GIAO Diem by the Pediatric Nutritional Supplement Program extension. By 2009, due to the Abbot financial and other assistance as well as AmeriCares administrative and subject-related instructions, the program had covered 1,718 children in the central provinces of Quảng Trị and Hue as well as the southern province of Dong Thap.

The main program tasks include the following:

1) **nutrition.** Children received two cups of fresh soymilk, peanuts, snacks including fruit, rice water, vitamins with iron and calcium on a daily basis. Schoolchildren engaged into the program underwent a regular health check conducted by healthcare specialists;

2) **teaching and learning.** The program provides for onsite seminars for parents and teachers to inform them what right nutrition and childcare imply as well as how to use such local materials and resources as soybeans for children meals preparation.

3) **infrastructure improvement.** Besides donations for well-balanced feeding provision, grant support for school canteens modernization was ensured.

According to teachers’ observations, students’ nutrition improvement resulted into a higher degree of concentration, energy and cooperation among the program participants. The Pediatric Nutritional Supplement Program managed to decrease the anemia level among the target social groups by some 30%, which allowed 1,360 children to achieve their normal weight in the 2006-2007 academic year.

3.21.5. Volunteers Engagement in SFPs

SFPs are mostly coordinated by school personnel, community members, students and their parents on a volunteer basis. Volunteers fulfill the following tasks: SFP menu compilation, food purchase, food preparation and distribution, cleaning before and after a meal.

4. CONCLUSIONS AND RECOMMENDATIONS

The research of school feeding status and problems testifies to the fact that they are closely related to such issues as poverty and inequality combating, food products economic and physical accessibility provision for vulnerable social groups, food security on the whole. In spite of those actions implemented by the international community, the APEC economies face large and urgent tasks related to development and implementation of complex social programs of food provision and healthy eating support for all sections of population, mainly poor and low-income ones.

Further development of the school feeding system can and should imply a perspective of becoming a new dominant idea of the APEC economies socio-economic development, including food systems and related institutional modifications.

This status of school feeding development will allow providing progressive shifts in respect of high quality and safe feeding arrangement for a large population category in accordance with scientific recommendations. Besides, it will ensure incentives for extending production and purchase of local goods of a set quality through additional fundraising meant both for local food products purchase and branch technical and technological development.

It will result into an impulse of food systems modernization, from farms to end-consumers, including infrastructure and required logistics. It is what one of the tasks related to school feeding development in the APEC region implies.

The WTO membership imposes certain restrictions upon the direct support of the APEC economies agriculture but promotes the gravity centre of federal financial resources application being shifted to the end-user's sphere. The food demand formed in such a way will lead to supply activation, including the sphere of agriculture. It ensures prerequisites for the capital influx to the sphere of food production and distribution, new jobs creation, and incomes increase.

The research of school feeding issues demonstrated a necessity of further activity aimed at developing a unified and coherent system of factors, single terms and definitions, school feeding status assessment criteria and indicators, methods of calculation, processing and analysis of corresponding development programs.

One should especially emphasize an issue of creating an information resource for statistics collection, storage and exchange in the sphere of school and social feeding programs in the APEC region. It will enable to take consistent measures for establishing such tools of sustainability and food security increase as regional food (grain) fund used for evening out food prices spikes and satisfying students' needs.

Other direction of joint activities related to increasing school and social feeding programs efficiency implies such programs transformation into a mechanism of agricultural support not contradicting the WTO requirements.

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6. APPENDIX

Questionnaire for Country Interviews⁶⁶

I. Background

Do all schools participate in the national school feeding program? If not, how are certain schools targeted?

How many children participate in your country's school feeding program each school day?

Please specify all feeding modalities used:

- ☐ Breakfast
- ☐ Snack
- ☐ Lunch
- ☐ Take-home ration (THR)
- ☐ Milk program
- ☐ Other

II. Transition to National Program

How long have you operated a national school feeding program?

What events influenced your transition to a national school feeding program?

What other organization(s) operated school feeding programs in your country before the national school feeding program started? Please list the major organizations.

What were the major steps in transitioning to a national school feeding program?

Did you have any special funding to assist with the transition? If so, please state the amount and source of funding.

Did you have special technical assistance to help with this transition? If so, who provided this assistance? Please describe the assistance given.

III. Institutional Framework

Which Department or Ministry administers the program? If there is more than one, what are their respective roles and how do they coordinate?

Does the administrative agency designate a person responsible for the overall administration of the national school feeding program?

Does the national administrative agency have a monitoring and evaluation process for the national program?

Who actually operates the program at the local level? What is the role of the provincial/state governments?

Do other organizations in your country sponsor school feeding programs? For example, provinces/states, local communities, non-governmental organizations, others?

⁶⁶ Extracted from: Country Policy and Funding Mechanism Study. November 2009. Prepared by the Global Child Nutrition Foundation. www.gcnf.org

IV. Policy Framework

Is there a legal basis for the national school feeding program? For example, is there a law, executive order or other written policy pronouncement?

Briefly describe any major policies associated with the school feeding program.

What are the objectives of the national policy? Have these objectives been clearly articulated in writing or communicated by government leaders?

Do any of these objectives link school feeding to local farm production?

V. Program Design

Does your national school feeding program reflect the legislative priorities?

Is there a regulatory (or other written procedure) that establishes the program requirements?

If yes, what kinds of requirements are included in the framework:

___ Nutritional requirements for meals

___ Food procurement requirements

___ Student/school eligibility for meals

___ Community involvement

___ Other

Are certain students targeted to participate in the national school feeding program? If so, how?

Are meals planned to meet the recommended daily nutritional requirements?

VI. Procurement

Are the food items used in the school meal programs linked to local farm production? If so, in what ways?

Are there federal or provincial requirements for purchasing food from local farmers?

If so, what is the source of these funds and how are they used?

Are there provisions for purchasing food from a particular group of farmers?

Can you estimate what percentage of food used in the school feeding program is grown in the country?

What percentage is grown within 50 kilometers (30 miles) of the school?

What is the source of foods procured from other than local farm production?

Please list the foods most commonly used in school feeding.

VII. Community Participation and Ownership

In what ways do local communities contribute to the school feeding program (i.e., through labor, food or cash contributions?)

Are parents and local stakeholders involved in planning and evaluating the program? In what ways?

VIII. Funding

What is the current program budget? Has it changed over time? How?

What is the funding source(s) for your program?

- _____ Federal government
- _____ Provincial government
- _____ Local communities
- _____ NGOs
- _____ Private sector contributions
- _____ Taxes
- _____ Parental cash payments
- _____ In-kind
- _____ Other

If from federal or provincial sources, where does their money come from?

- _____ Tax on luxury items
- _____ Cell phones
- _____ Sales taxes
- _____ Airport tax
- _____ Other

If from taxes, does the government provide incentives, such as tax breaks on other items or give other benefits?

How are funds reflected in the national budget (line item or part of larger budget)?

Does the federal government clearly identify funds to be used for school feeding?

What department is responsible for the program's financial administration?

Are federal funds passed on to Provinces and/or local program operators? If yes, how are they allocated or paid?

Is there an audit process to track whether funds are being used for their intended purpose? If so, who is responsible for such monitoring?

Have there been allegations of financial mismanagements or "leakages?" If so, has corrective action been taken?

Do you have a procedure for measuring the cost of the program and/or projecting future costs? If yes, please describe.

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School Milk Programme in Thailand

By Dr. Issara Suwanabol

History of the School Milk Programme in Thailand



The establishment of the National Milk Drinking Campaign Board (NMDCB) by the Cabinet decision in 1985 stems from the farmers protests of 1984 on unsold milk. A pilot programme was implemented in selected areas of Bangkok and Chiangmai for parents to purchase milk at 25% less the normal priced milk through monthly coupons for their children in Primary and Kindergarten schools. This programme was the origin of the national School Milk Programme of Thailand. Over the years, the programme was

later expanded and today all school children in public schools are provided with 200ml of free milk.

School Milk in the Thai Context

The principle objective of the National School Milk Programme is to support the Thai dairy industry, by providing an outlet for locally produced milk. By providing milk to the young at an early stage, will also through time developed a taste for milk and hence a market for the future. Statistic has shown that while the milk per capita milk consumption of Thailand was a low of 2 litres in 1984, a year, but risen to as a high of 23 litres in 2002. The dairy market has also raised from a 290 million litres a year business in the early 90's to an 1146 million litres market by 2003. Local herd size has growth from 132,000 in 1989 to 412,000 in 2003.



School Milk is a vital part of the Thai dairy market, so much so that it accounts for more than 30% of the total liquid milk market. As a result school milk days has been expanded from the 200 days school calendar to 230 feeding days, with an extra 30 days of milk for consumption in the holidays. Milk is distributed in long life (UHT) packs for parents to pick up from schools.

Today, the operation of the Thai school milk is carried out by the Ministry of Agriculture, Livestock Bureau. As per the cabinet consensus in 2003, only plain milk in both UHT and pasteurised format are provided. For administration purposes, the whole country is divided into three-school milk zone, labeled as zone, 1,2 and 3. The principle is that the consumers and the suppliers of milk must be within the same zone, such that raw milk in zone 1 must be processed by a dairy in zone 1 and be consumed by schools in zone1. This zoning is to provide a balance of supply and demand and support a more equal allocation of resource. Dairy wishing to be a school milk supplier by first be certified by

the Ministry of Industry, in possession of a valid food safety certificate from the Thai FDA and have a long term contract to buy local raw milk. All school milk must be made from liquid raw milk and not from powder. By 2004 all school milk supplier must be HACCP certified. The bureau of budget controls the school milk budget and the whole thing is then reporting to the National Milk Policy Committee under the office of the Prime Minister.



Conclusion

The success of school milk in Thailand stems is not just measured in terms of nutritional benefits, a subject I have touch on in previous International FAO sponsored school milk conferences. The economic benefits and the support in national development is less known. Without school milk to provide a stable platform by which to support the growth of the Thai dairy industry, the Thai dairy will definitely not have experience such growth.

THAILAND
A Desk Review of the School Feeding Programmes

World Food Programme's Home Grown School Feeding Project

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Table of Contents

1. INTRODUCTION.....	6
1.1. PROFILE: THAILAND	6
1.2. ADMINISTRATION	7
1.3. ECONOMY	8
1.4. EDUCATION.....	8
1.5. NUTRITION.....	9
1.6. RECENT EVENTS	11
2004 Asian Tsunami.....	11
2006 Coup.....	11
2. HISTORICAL DEVELOPMENT OF SCHOOL FEEDING	12
2.1. EARLY LOCAL GOVERNMENT INITIATIVE: BMA.....	12
2.2. EARLY CENTRAL GOVERNMENT INITIATIVE: NATIONAL PRIMARY EDUCATION AUTHORITY	12
3. SCHOOL LUNCH PROGRAMME (SLP).....	13
3.1. CONTEXT AND AIMS.....	13
3.2. TARGET BENEFICIARIES	14
3.3. FUNDING	15
3.4. GOVERNANCE	18
3.5. PROCUREMENT	19
3.6. IMPACT.....	20
3.7. RECENT INITIATIVES AND IMPROVEMENTS TO THE PROGRAMME	21
Meal quality and nutritional content	21
School agriculture	22
Nutritional education	23
Community involvement	23
Rice consumption.....	23
4. SCHOOL MILK PROGRAMME (SMP)	24
4.1. CONTEXT AND AIMS.....	24
4.2. FUNDING AND GOVERNANCE.....	26
4.3. PROCUREMENT	27
4.4. IMPACT.....	28
5. HRH PRINCESS MAHA CHAKRI SIRINDHORN'S AGRICULTURE FOR SCHOOL LUNCH PROJECT	29
5.1. PROJECT SUMMARY	29
6. CONCLUSION.....	31
6.1. FROM QUANTITY TO QUALITY	32
6.2. LOCAL PROCUREMENT AND RURAL DEVELOPMENT	33
6.3. BUDGETARY AND POLICY ISSUES.....	33
6.4. SCHOOL MILK AND LOCAL PROCUREMENT	34
6.5. SCARCITY OF DATA: CHALLENGE FOR FUTURE RESEARCH.....	34
7. BIBLIOGRAPHY.....	36
8. LIST OF CONTACTS.....	41

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List of Acronyms

ADB	Asian Development Bank
BMA	Bangkok Metropolitan Administration
BPP	Border Patrol Police
CIA	Central Intelligence Agency
CRC	Committee on the Rights of the Child
FAO	Food and Agriculture Organisation
LAO	Local Administration Organisation
NESDP	National and Economic Social Development Plan
NFNP	National Food and Nutrition Plan
APHCA	Animal Production and Health Commission for Asia and the Pacific
SLP	School Lunch Programme
SMP	School Milk Programme
SRC	Sub-committee on the Rights of the Child
UNESCO	United Nations Educational, Scientific and Cultural Organization

WFP World Food Programme

1. Introduction

1.1. Profile: Thailand

The Kingdom of Thailand is situated in Southeast Asia and has a population of 64 million (in 2005, estimated 65 million in 2007) (CIA 2007). According to the United Nations Thailand (2007), the middle-income country now has a Human Development Rating of 0.768 and is set to achieve most, if not all, of the global Millennium Development Goals well in advance of 2015. It reduced the poverty rate from 27% in 1990 to 9.8% in 2002, and the proportion of underweight children also fell by nearly half in the same period (UN Thailand 2007). The table below gives a snapshot of the country's development profile.

Thailand: Some Basic Facts and Development Indicators

Population	65 million (2007 est.)
Annual population growth rate	0.663% (2007 est.)
Population in urban areas	32.0% (2005)
Ethnic groups	Thai 75%, Chinese 14%, other 11% (2000 census)
Religions	Buddhist 94-95%, Muslim 4-5%, Christian, Hindu, Brahmin, other (2000 census)
GDP per capita (PPP)	US\$9,100 (2006 est.)
GDP real growth rate	4.8% (2006 est.)
Labour force	36.41 million (2006 est.)
Labour force by occupation	Agriculture: 49%, industry: 14%, services: 37% (2000 est.)
Unemployment rate	2.1% (2006 est.)
Poverty (national poverty line)	9.8 % (2002)
Industries	Tourism, textiles, garments, agricultural processing, cement, integrated circuits,

	jewellery, electronics, and auto assembly
Human development index rank	0.768 (2004)
Adult literacy	92.6 % (2004)
Children under five years of age stunted for age	15.5% (2006)
Children under five years of age underweight for age	7.3% (2006)
Children under five years of age overweight for age	10.4% (2006)

(Sources: CIA 2007, UN Thailand 2007, Bureau of East Asian and Pacific Affairs US Department of State 2007)

1.2. Administration

Thailand is a constitutional monarchy. King Bhumibol Adulyadej, the chief of state, the Prime Minister, the head of government, and the Council of Ministers (Cabinet) make up the Executive branch. Prior to the military coup d'etat led by General Sonthi Boonyaratglin in September 2006, the bicameral National Assembly or Rathasapha consisted of the Senate or Wuthisapha (200 seats, elected by popular vote for a 6-year term) and the House of Representatives or Sapha Phuthaen Ratsadon (500 seats, elected by popular vote for a four-year term). Following the coup, an interim Prime Minister, Cabinet and 250-member National Assembly (acting as Senate and House of Representatives) were appointed. The Judicial is composed of the Constitutional Tribunal, the Courts of Justice, and the Administrative Courts. The country is currently under an interim constitution issued by the coup leaders, according to which a new constitution will be written and ratified by the end of 2007 to replace the 1997 constitution. The administrative subdivisions consist of 76 provinces (including Metropolitan Bangkok), subdivided into 796 districts, 81 subdistricts, 7,255 tambon administrations, and 74,435 villages (Bureau of East Asian and Pacific Affairs, US Department of State 2007; CIA 2007).

1.3. Economy

Thailand has enjoyed rapid economic growth in the past several decades. It recorded an average annual GNP growth rate of 6.7% over the period 1968-1986 and was the fastest growing economy in the world over the years 1987-1996 (Warr 2007: 139). Since the 1997-1998 financial crisis, Thailand has made a remarkable, though initially slow, recovery, which was made possible by strong exports and growth in private consumption (World Bank 2007a). The real GDP growth rate since the crisis has been moderate, at 5 % (Warr 2007: 140). The Economist Intelligence Unit (2007) predicts the growth rate to be 4-5% over the years 2007-2011.

Today, Thailand is an export-dependent economy led by industry, which accounts for 44.6% of GDP and includes manufacturing of computers/electronics, garments/footwear, furniture, wood products, canned food, toys, plastic products, gems, jewellery as well as high-technology products. Tourism also contributes significantly to the economy, totalling about 6% of GDP (Economist Intelligence Unit 2007; Bureau of East Asian and Pacific Affairs, US Department of State 2007; World Bank 2007a; Hoontrakul and Ryan 2004). While the manufacturing and service sectors have boomed, agriculture, the traditional backbone of the economy, has decreased in importance. Its contribution to GDP, along with forestry and fishing, is estimated to be about 10.7% (Bureau of East Asian and Pacific Affairs, US Department of State 2007.; see also Winichagoon *et al.*, n.d.). Despite its decline, however, about 40% of the labour force continues to be employed in agriculture (Ibid.), and the country ranks among the top exporters of rice, sugar and chicken in the world (Zamroni 2006: 57).

While the recovery from the financial crisis and the continued growth have resulted in lower incidence of poverty (World Bank 2007a), some regions and vulnerable groups have been left behind and inequality has widened. These groups include the people living in poverty in rural areas and employed in agriculture as well as children in the Northeast, the North and the deep South, where more than one million suffer from malnutrition (UN Thailand 2005: 1; Warr 2007: 153-4).

1.4. Education

The current Thai educational system is based on 9-year compulsory education, with 12-year free basic education guaranteed by the constitution (Ministry of Education n.d.; CRC 2004: 110). In 2005, 14.4 million students were enrolled in the age group 3-21. Eighty-two percent of educational

institutions are public and 18% private. In Bangkok, the figure is 70% public and 30% private (Ministry of Education, n.d.).

Current Thai Educational System

APPROXIMATE AGE	GRADE	EDUCATIONAL LEVEL/2005STUDENT NUMBER/ GER (GROSS ENROLMENT RATE)
Age 3-5	NA	Pre-primary (1.8 million students, GER 75%)
Age 6-11	Grade 1-6	Primary (5.8 million students, GER 104%)
Age 12-14	Grade 7-9	Lower secondary (2.7 million students, GER 95%)
Age 15-17	Grade 10-12	Upper secondary (1.1million students, GER 63%)
Age 18-21	Grade 13-16	Undergraduate (1.9 million students, GER 56%)
Age 22 and over	Grade 17-18	Graduate (179,191 students)

(Source: Ministry of Education, Thailand, n.d.)

1.5. Nutrition

Thailand's national food and nutrition activities date back to the establishment in 1926 of the Nutrition Section in the Department of Public Health (Kachonam *et al.* 1992). The first National Food and Nutrition Plan (NFNP) was implemented in 1977 as part of the fourth National and Economic Social Development Plan (NESDP). Malnutrition (especially protein-energy malnutrition), among pregnant and lactating women and preschool and school-age children, was (and to some extent continues to be) identified as the principal nutritional problem of the nation (Ibid.; Tontisirin *et al.* 1995; FAO 1996: 30; Winichagoon *et al.* n.d). While malnutrition was

regarded in these early years primarily as a health problem with a top-down approach, the second NFNP (years 1982-1986) may be seen as a turning point in the government's nutrition policy in that, firstly, it linked malnutrition to poverty alleviation and rural development, and secondly, it incorporated the primary health care approach, with greater emphasis on community participation. Among the community nutrition programmes under this NFNP was the provision of subsidies for school lunch in rural primary schools (Kachonam *et al.* 1992; Tontisirin *et al.* 1995; Heaver and Kachondam 2002: 5; Winichagoon *et al.* n.d).

Thailand was one of the first countries to implement the concept of primary care (Heaver and Kachondam 2002: 4), which established a tradition of volunteerism and community participation, making its community nutrition programmes among the most successful in Asia (Ibid.; see also Onis *et al.* 2000: 1231; Winichagoon *et al.* n.d). By 1989, midway through the sixth NESDP, more than half a million volunteers had been trained, giving the Plan almost universal outreach in rural areas (Tontisirin *et al.* 1995; Kachondham *et al.* 1992; Heaver and Kachondam 2002: iii). High literacy levels and a cultural tradition of community service and mutual help, as well as political commitment and favourable economic growth, have been cited as the key success factors (Heaver and Kachondam 2002: 19; see also FAO 1996: 29-32).

Thus, the years 1975-1990 recorded a drastic reduction in child malnutrition from 36% to 18%, followed by a further reduction from 18% to 8.42% during the period 1992-2005¹ (Jumpatong 2007: 5). However, micronutrient deficiency remains a persisting national public health problem (e.g. the iodine deficiency rate was 2-6.8% in 1995) (Jumpatong 2007: 5; see also SRC 2000: 21; Kosulwat 2002), and child malnutrition, especially in remote rural areas, continues to be a major concern. Since the third NFNP (under the sixth NESDP), the concept of quality of life has been translated into the "basic minimum needs" approach with eight categories of indicators for problem identification, progress monitoring and evaluation (Kachondham *et al.* 1992; Winichagoon *et al.* n.d.). The seventh to the current tenth NESDPs have focused on poverty alleviation

¹ These figures are based on the data reported by the Ministry of Public Health and the Ministry of Education, which use the Thai growth standard. According to Heaver and Kachondam (2002: 2), there has been some confusion over the reduction of protein-energy malnutrition and iodine/vitamin A deficiency in Thailand due to erroneous presentation of the Ministry of Public Health data and/or unqualified presentation of sample survey data using the Thai national reference standard. The same authors, using independent survey data, estimate that Thailand reduced moderate malnutrition in the under-five population from about 25% in 1986 to about 15% in 1995, almost eliminating protein-energy malnutrition as a national public health problem.

and improved quality of life by ensuring household food and nutrition security. Thailand's national School Lunch Programme (SLP) was shaped in the context of these nutritional concerns and initiatives.

Whilst Thailand continues to tackle the problems of malnutrition and micronutrient deficiencies, a shift in the food intake and lifestyle patterns in the recent decades has also resulted in a dramatic rise of overweight and obesity among children and adolescents, especially in affluent urban populations² (Kosulwat 2002; Kantachuvessiri 2005). Hence it may be said that recent social and economic transitions have created a situation where nutrition-related health threats such as malnutrition and micronutrient deficiencies have come to coexist with "the diseases of affluence" in Thailand (Kosulwat 2002: 186).

1.6. Recent events

2004 Asian Tsunami

The December 2004 tsunami, the worst natural disaster to strike Thailand, caused 5,395 deaths and resulted in 2,817 missing persons and 1,480 orphaned children (loss of one or both parents), as well as massive destruction of property and the environment with serious consequences on the livelihoods of thousands who depend on the fishing and tourism industries (UN Thailand 2007b).

2006 Coup

As noted earlier, following the September 2006 military takeover, the coup leaders put in place an interim constitution and appointed a National Legislative Assembly. General Sonthi Boonyaratglin took power as head of an interim Council for Democratic Reform (now called the Council for National Security) run by the military. The Council named former Privy Councillor Surayud Chulanont as interim prime minister to govern until the elections scheduled for late 2007. A National Counter-Corruption Commission was also appointed to investigate corruption allegations against the former premier (Asia Media 2007; Fry 2007).

² As Kosulwat (2002: 186) notes, surveys in greater Bangkok demonstrated that, in 1992, the prevalence of overweight and obesity among 6–12 year-old children in middle- to high-income families was between 25.7% and 27.4%, while it was 11.2% among those from middle- to low-income families. In 1994, the rate increased to 28.1%, 32.3% and 14.6%, respectively.

2. Historical Development of School Feeding

While Thailand's national School Lunch Programme (SLP) was not enshrined in law until 1992, there seem to have been a number of precursors in the previous years. Two such earlier initiatives – one by a Local Administration Organisation (LAO) and another by the central government – are briefly summarised below.

2.1. Early Local Government Initiative: BMA

The Bangkok Metropolitan Administration (BMA) started a school lunch programme in 1977, targeting children from the city's lower income households. The funding for this programme was partially government provision and partially donations from the private sector and individuals. Of 427 schools, 402 requested help for 40,879 children in 1991, with the budget of 1.85 baht per head per day. The programme was administered by school committees, with teachers responsible for the menu and preparation of the meals (Kachondham *et al.* 1992). With the enforcement of the 1992 Act (see below), all BMA schools came under the national SLP (Jumpatong 2007, personal interview).

2.2. Early Central Government Initiative: National Primary Education Authority

Although the early history of school feeding in Thailand is scarcely documented, it is known that the earliest origin of national-level school feeding can be traced back to the 1950s (Jumpatong 2007: 2). The Ministry of Education recognised the problem of child malnutrition and campaigned for a school lunch programme in 1952 (WFP 2007).

More recently, in 1987, the National Primary Education Authority (the current Office of Basic Education Commission), under the Ministry of Education, directed every school to implement a free school lunch programme for all students. Though impeded by insufficient funding, this initiative promoted public recognition of the importance of school feeding and eventually led to the establishment of the current national programme (Jumpatong 2007: 2). Under this initiative, the Authority provided assistance to schools in deprived rural communities where agricultural production was low or not feasible and students were unable to afford to buy lunch (Kachondham *et al.* 1992). In 1990, 31,349 schools and approximately 6.7 million children benefited from the scheme. Schools adopted varying modalities of operation, depending on the availability of human resources, funding, community support, and

individual teachers' enthusiasm: some schools were able to provide lunch every day, others every other day, and yet others provided soy milk during afternoon breaks as supplementary food (Ibid.; UNESCO Bangkok, n.d.: 54). However, in addition to the inadequacy of funding, the scheme was hampered by the absence of appropriate management guidelines and technical expertise. In the 1980s, a student received an average of only 10 baht per year. Kachondham *et al.* (1992) thus commented in 1992: "the disparity between primary school students in Bangkok and in rural areas regarding the budget for the school lunch programme is quite conspicuous. Therefore, despite the fact that the school lunch programme is not new, its success has been rather modest." The introduction of the 1992 Act brought about a significant change to this state of affairs.

3. School Lunch Programme (SLP)

3.1. Context and Aims

The Fund for School Lunch of Primary School Act B.E. 2535 was enacted in 1992, securing annual central government funding for the national School Lunch Programme (WFP 2007; Jumpatong 2007: 2). The Act states the aim of the programme as the alleviation of nutritional problems among school children. The key concern, especially in the early years, was malnutrition (underweight). Other aims, as identified by Jumpatong (2007: 1; see also Chittchang 2005), include:

- Enhancing food security;
- Promoting desirable eating habits; and
- Promoting full growth and development of children.



In addition, there are a number of roles that the SLP may potentially play and are beginning to attract greater attention. For instance, the Ministry of Education today acknowledges the importance of food education and agricultural activities, which are being integrated into the programme (see

below). There is also growing recognition of the importance of school lunch in enhancing rice consumption, with both health/nutritional and socio-cultural benefits (see below) (Jumpatong 2007, personal interview).

3.2. Target Beneficiaries

The programme is implemented in all public primary schools (Grade 1-6) (approx. 30,000 schools) and kindergartens. It targets children suffering from malnutrition, and to a lesser extent, children living in poverty in remote rural areas. The free school lunch entitlement criteria are specified as follows:

- All malnourished children in the schools operating under the Ministry of Education;
- All students at the Border Patrol Police (BPP) schools operating under the BPP Bureau, the Royal Thai Police (which are located in harsher
Source: Barrow (2005a) *Eating Lunch in a Thai School*

rural conditions with inadequate facilities);

- All students at the Royal-Public Welfare schools; and
- Economically disadvantaged students (Not all of these children are covered. See below.) (Chittchang 2005).

SLP Beneficiaries

	OCT 97- MAR 98	MAY-SEP 98	OCT 98- MAR 99	MAY- SEP 99	OCT 99- MAR 2000
Kindergarten	642,628	844,302	687,940	687,943	738,542
Primary school	1,539,235	2,024,565	1,680,793	1,885,864	1,848,662

(Source: SRC *et al.* 2000: 142)

About 1.8 million primary school children and nearly 700,000 kindergarten children currently benefit from the programme annually – equivalent to about 30% of all school children, covering all malnourished school children and about half (48.81% in 1998) of the school children living in poverty (Jumpatong 2007: 2). The government grant is used by individual schools either to purchase foodstuffs, which are cooked at school facilities by teachers, students and community volunteers (especially mothers) taking turns (due to the absence of kitchen staff in schools), or to engage private catering services.



Source: Sri Wittayapaknam School (2005) *What is Your Favourite School Lunch?*

Higher grade students often take turns to assist in food preparation, serving, and cleaning (Ibid.: 6). Jumpatong (Ibid.: 4) identifies four modalities of school feeding in the country, three of which involve the SLP funding:

- Lunch is provided entirely on the basis of family funding (i.e. Students can afford to buy lunch): relatively privileged schools in urban areas;
- Free lunch is provided to poor or underweight children and sold to others: schools in suburban or middle-income communities;
- Free lunch is provided to poor or underweight children. Additional food is given to those who bring only rice from home and sold to those who can afford it: schools in semi-rural areas; and
- Free lunch is provided to all students: common in schools in remote areas.

3.3. Funding

Under the 1992 Act, the central government was required to provide 500 million baht each year to the Fund for School Lunch of Primary School until a total funding of 6,000 million baht was reached. The programme was to be operated on the Fund's interest, and the target of 6,000 million baht was reached in 2000. However, due to the lower interest rate and fluctuations in the national economy, an additional budget of about 2,000-3,000 million baht has been allocated annually by the government (Chittchang 2005; Jumpatong 2007: 2). In a personal interview, Jumpatong (2007) estimated the current additional funding to be around 5,000 million baht per year.

The government provided initially 5 baht per child per day throughout the 200 days of the school year. This amount was increased, following the recommendations of an evaluation study conducted by Mahidol University in 1995 (Chittchang 2005), first to 6 baht in 1999 (SRC *et al.* 2000: 142; CRC 2004: 115), and then to 10 baht in 2004 (Chittchang 2005; Jumpatong 2007: 2, WFP 2007). In 2007, a budget of over 5,143 million baht has been allocated for the programme. The annual programme budget from 1992 (inception year) to the present is shown in the table below:

Annual Budget for the SLP (baht)

YEAR	KINDERGARTEN	PRIMARY	TOTAL
1992	-	30,000,000	30,000,000
1993	100,000,000	120,000,000	220,000,000
1994	332,800,000	1,000,000,000	1,332,800,000
1995	262,116,500	797,587,500	2,146,600,000
1995	262,483,500	824,412,500	-
1996	287,500,000	823,685,500	2,285,689,200
1996	287,500,000	887,003,700	-
1997	287,500,000	883,851,500	2,411,954,000
1997	324,454,000	916,148,500	-
1998	321,309,000	769,617,500	2,525,360,000
1998	422,151,000	1,012,282,500	-
1999	412,764,000	1,008,475,800	2,965,524,000
1999	412,765,800	1,131,518,400	-
2000	443,125,200	1,103,197,200	3,212,506,200
2000	443,125,200	1,223,058,600	-
2001	494,344,800	1,268,105,400	3,272,054,400
2001	406,015,200	1,103,589,000	-
2002	871,540,800	2,207,146,800	3,078,687,600
2003	N/A	2,556,091,200	2,556,091,200
2004	N/A	3,394,436,600	3,394,436,600
2005	N/A	5,004,598,000	5,004,598,000
2006	N/A	5,279,190,000	5,279,190,000

2007	N/A	5,143,944,200	5,143,944,200
Total	-	-	44,859,435,400

Note: The Thai fiscal year is from 1 October to 30 September. The budget is allocated twice a year: hence two entries for years 1995 onwards.

(Source: Ministry of Education, Thailand, 2007)

The budgetary allocation – first to LAOs (such as municipalities and tambon administrative organisations) and then to schools – is determined on the basis of the number of children with malnutrition, which in turn is determined by a national growth monitoring system. Teachers in all primary schools since 1986 have carried out weight-for-age growth monitoring (using the Thai standard), and children found to be malnourished by this procedure are entitled to free school lunch (Kachondham *et al.* 1992). Until around 2003, the provincial primary education supervisor³ used these growth monitoring data for resource allocation to individual schools. Following the decentralisation of education management, schools currently submit these growth monitoring results in an annual report to LAOs, which then report directly to the central government for budgetary allocation (Ibid.; Jumpatong 2007, personal interview and communication).

As for economically disadvantaged children, the central government provides funding to the most deprived provinces on the basis of the provincial poverty index, and hence it does not reach all children in need. As in the case of malnutrition, teachers at each school compile the number of children in need of free school lunch for financial reasons, which is reported to LAOs in an annual report, which is in turn reported to the central government for budgetary allocation. Thus the system is today considerably localised: the government funding bypasses provincial governments and is allocated directly to LAOs and then to schools. Notably, the system relies primarily on local knowledge: individual teachers' personal knowledge of their students and their needs rather than official surveys (Jumpatong 2007, personal interview). According to Jumpatong (Ibid.), this system rests on the fact that most teachers are residents of local communities and that community members enjoy close relations and personal knowledge of each other. While

³ Provincial education offices have since been replaced by Local Education Areas, as part of the education reform of 2004, which has decentralised education management to improve outcomes through increased community participation (Jumpatong 2007 personal interview; ADB 2007).

significantly different from formal procedures characteristic of Western bureaucratic systems, this has proven to be suitable and accurate in the Thai context (Ibid.).

Although the central government subsidy does not reach all economically disadvantaged children, LAOs at the local level provide supplementary funding to cater for those who are not covered. Consequently, 95% of all school children (including those who can afford to pay and do not receive free lunch) currently have access to lunch every day at school (Jumpatong 2007: 4). The remaining 5% may receive free lunch a few days a week, which is due not necessarily to financial constraints but to the problems of access: most of these children are located in remote, hard-to-reach areas, which creates logistical problems for meal provision (Jumpatong 2007, personal interview). This suggests significant progress since 1995, when the Mahidol University evaluation study found that the funding was insufficient and that some schools had to discontinue the service whenever the funding ran out (Chittchang 2005).

3.4. Governance

The programme has been implemented under the initiative of the Ministry of Education. Since 2001, the Ministry of Interior, which is in charge of provincial and local government, has also been involved, as part of the wider decentralisation process.⁴ The Ministry of Education manages the interest from the Fund for School Lunch of Primary School, whereas LAOs, under the



Source: Barrow (2005a) *Eating Lunch in a Thai School*

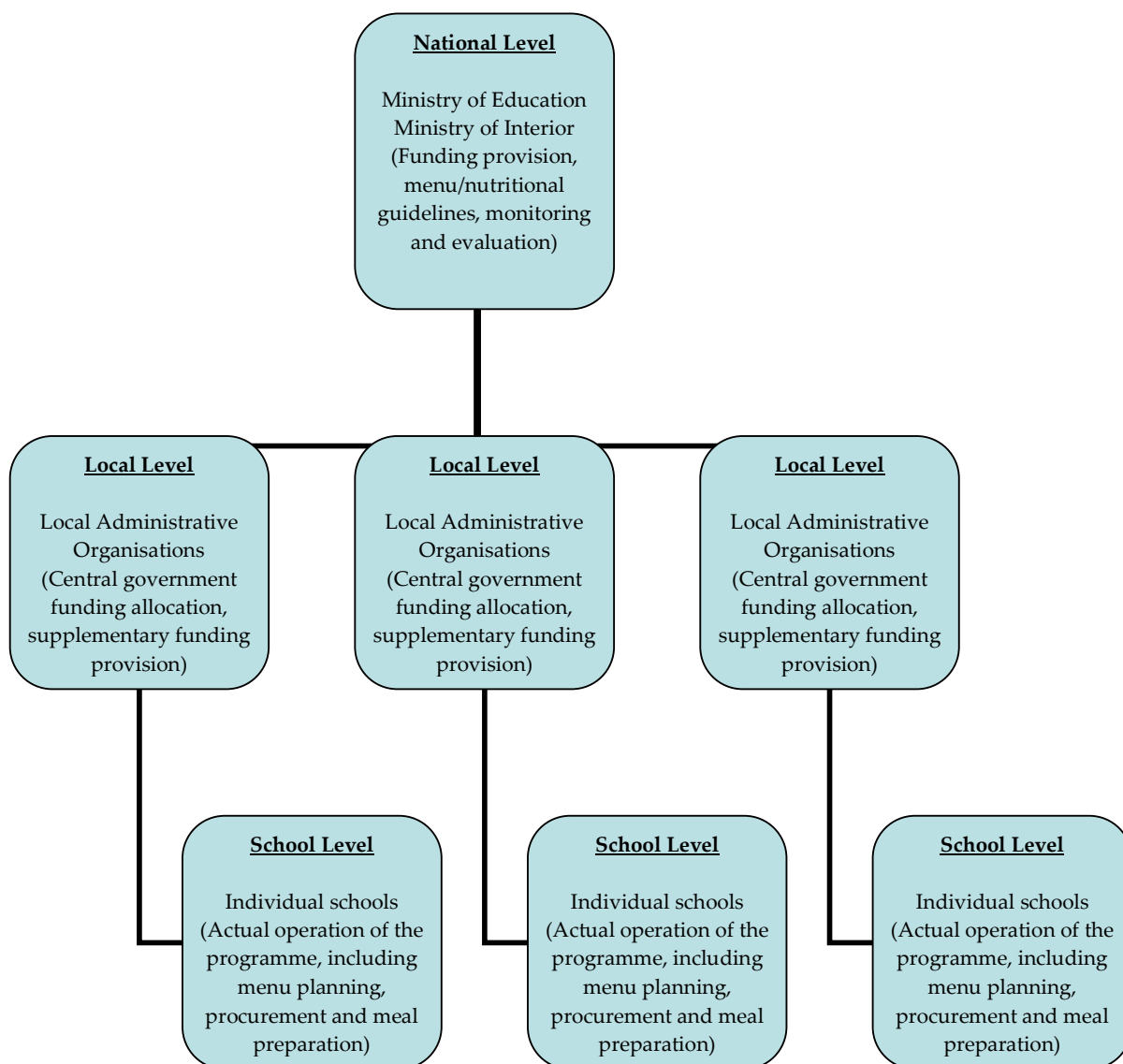
Ministry of Interior, manage the additional central government funding as well as provide supplementary funding of its own for the cost of free lunch for economically disadvantaged children. At the school level, individual schools exercise authority over the actual usage of the grant and the implementation of the

programme. Matters relating to the sourcing, cooking and serving of food are

⁴ Thailand has undergone some decentralisation of power to local governments, which began with the seventh NESDP (1991-1996) and was formally enshrined in the 1997 constitution (World Bank 2007b; Wegelin 2002: 2).

left entirely to individual school policies and initiatives (Jumpatong 2007, personal interview).

SLP Governance Structure



(Source: Jumpatong 2007, personal interview and communication)

3.5. Procurement

The procurement mechanism of the programme has not been documented in detail to date. As noted above, the SLP today operates under a decentralised

system whereby individual schools are given the authority to determine the usage of the subsidy including the procurement method – where the food is produced, whom to buy it from, how the food is cooked and served, etc. (Ibid.). The purchasing process is informal and does not involve public tenders. There is therefore no formal procurement mechanism or emphasis to promote local sourcing. However, despite this absence of formal policy, local



Source: Barrow (2005b) *Top 10 Thai School Lunches*

sourcing is a very common practice under the programme. Most (estimated to be around 90%) schools purchase perishable food items (such as fresh vegetables and meat) from local producers, often via local markets. A small minority (estimated to be less than 10%), mainly in urban areas, engage the services of private catering companies (Ibid.). While local procurement (especially market purchase) may be distinguished from procurement of locally produced food, Jumpatong (2007, personal

interview) estimates most of the food thus procured to be of local provenance. It may be speculated therefore that schools customarily purchase local produce on a regular basis. The programme is in this sense implicitly and potentially largely “home grown.” Jumpatong (Ibid.) explains that local sourcing is a “normal” practice in Thailand, where the use of imported/transported food in school lunch is almost unheard of, given its higher price and the availability of cheaper and fresh local food. Schools may also complement purchased food with student agricultural activities (see below). Consequently only sauces and seasonings are normally obtained from large manufacturers (Ibid.).

3.6. Impact

The 1995 evaluation suggested a generally positive impact of the programme on the nutritional status of school children. There was a sharp decline in the prevalence of malnutrition among school children from 1993 to 1994, which corresponds to the period of the programme budget increase (Chittchang 2005). The rate remained relatively steady thereafter, although there was a slight increase after the 1997-1998 financial



Source: Barrow (2007) *Thai School Lunches*

crisis. Overall, the child malnutrition rate decreased from 18% in 1992, the inception year of the programme, to 8.42% in 2005 (Jumpatong 2007: 5). The impact seemed to be particularly significant among BPP school students, all of whom are entitled to free lunch. A sharp decline in the malnutrition rate among BPP school students, from 26.2% to 13.9%, was recorded in 1994, the first year of the significant budget increase (Chittchang 2005).

At the same time, the study highlighted some deficiencies of the programme, such as insufficient funding and nutritional concerns, and made a number of recommendations, which lead to recent initiatives and improvements as discussed below. No other comprehensive evaluation study by an independent body has been undertaken.

3.7. Recent Initiatives and Improvements to the Programme

In addition to the increased budget, the programme has undergone a number of improvements since its inception in the areas of nutrition, meal quality, education, and programme implementation in general. While the initial aim of the programme was to simply feed the target group, it has since broadened the scope of operation, encompassing such issues as the improvement of the meal quality, school agriculture, food education, and community involvement.

Meal quality and nutritional content

Jumpatong (2007: 6) notes that, while the programme objective in the past was “quantitative” in nature, now that it has been more or less achieved, the next stage of the implementation will focus on the “quality” of school lunch. The findings of the 1995 evaluation seem to have played a role in this new emphasis. The study found that there was no nutritionist assigned to schools and that very few schools used standard menus or were concerned about the nutritional content of the meal. Similarly, there was no menu planning and no mechanism or guideline in place to control the quality/quantity of the food served or sanitation. The meals were found to provide about 70% of the recommended target energy intake (one third of the Thai Recommended Daily Allowance).⁵ With no nutritional standards in place, components such as calcium, vitamin A, B1 and B2 were



Source: Barrow (2005b) *Top 10 Thai School Lunches*

⁵ The study however found that by combining school lunch and school milk (see below), both the recommended quality and quantity were met (Chittchang 2005).

inadequate. There was also urban-rural disparity in that half of rural schools did not provide meals with four food groups, whereas more than 80% of urban schools could do so. In short, as Chittchang (2005) summarises, there was a lack of strategy for quality control and development, recommended food standards, quality monitoring systems, and personnel training.

On the basis of the recommendations of the study, the programme has introduced the following initiatives:

- Training support for menu planning;
- Training support for growth monitoring;
- SLP nutrient requirements;
- Recommended recipes (in the form of a handbook of school lunch recipes);⁶
- Support for an iodized salt test kit; and
- Support for a food safety test kit (i.e. undesirable food additive tests) (Ibid.).

School agriculture

To complement the foodstuffs purchased with the government grant, the programme promotes food production activities at school, such as fruit and vegetable cultivation, and poultry, livestock (pigs and cows) and fish farming. Some schools may also cultivate rice in the school or community fields. Food thus produced is used to prepare school meals or sold for a profit. These activities are often supported by Agriculture Colleges and private enterprises in the area. Although yet to have a significant impact, these activities not only complements purchased food but provide students with an opportunity to acquire agricultural skills, especially in rural areas (Jumpatong 2007: 3). In many BPP schools in remote rural areas, the SLP is implemented in conjunction with the Princess Maha Chakri Sirindhorn's Agriculture for School Lunch Project (see below) to promote the two combined goals of nutrition and education.

⁶ The programme has launched a guideline for effective meal preparation, with a collection of over 100 recipes favoured by students in a national survey. The guideline recommends:

- That hygienic standards are maintained in food preparation;
- That all recipes be served with rice, dessert, fruits and milk;
- That rice be provided at least 4 or 5 days a week for sufficient nutrient and energy intake; and
- That the lunch guarantee 600-640 calories and provide 40% of recommended daily energy intake (Jumpatong 2007: 4-5).

Nutritional education

Nutrition classes are today conducted as part of Health Science, requiring students to acquire knowledge/skills of food selection for consumption in primary schools and to analyse nutritional effects on health problems in secondary schools (Ibid.: 5).

Community involvement

Due to continuing budgetary constraints, the Ministry of Education has called for improved management of the programme and greater local community involvement. In addition to their role in food preparation, community members may contribute to the programme by raising additional funds and food resources to complement the government grant (Ibid.: 4).

As discussed earlier, Thailand has a history of successful volunteerism in nutrition programmes. Community volunteers have been mobilised on a large scale to cut costs, empower local people, and promote effective communication with target groups (Heaver and Kachondam 2002: iii; see also Tontisirin *et al.* 1995). While this is already a key element of the Princess' Agriculture for School Lunch Project (see below), it is expected to grow in importance in the SLP as well.

Rice consumption

The drastic decline in rice consumption in Thailand and in Asia as a whole has been regarded by many as an issue of concern. In Thailand, rice is not only a staple food but central to the cultural heritage of the nation because of its close linkage with the language, customs, dress, art, and religion, as well as traditional cuisines. In this context, Jumpatong (2007: 6-7) argues, the SLP has significant potential to promote rice consumption, and, by extension, the traditional diet and culture.

Related to this is the growing influence of western diet, which has resulted in the recent rise of various chronic diseases such as the heart disease and child obesity in the country. Rice-based school lunch has an important role to play in the promotion of healthy eating, especially the traditional Asian dietary patterns in which rice and vegetables constitute the main component with a moderate intake of animal food. In view of this, the current SLP guideline recommends that all recipes be served with rice (Ibid.: 5-7). Jumpatong (Ibid.)

suggests that rice-based school meals may be extended to school breakfast, snack and/or dessert in the future.

4. School Milk Programme (SMP)

4.1. Context and Aims

The significance of the School Milk Programme (SMP) needs to be understood in the context of dairy farming in Thailand. The systematic development of the industry began in the 1960s with royal patronage and government support (FAO and APAHCA 2002; Delgado *et al.* 2003; Itsaranuwat and Robinson 2003; Garcia *et al.* 2005). The central government, with the aim of developing small-scale production, has been largely instrumental in the growth of the industry, by facilitating the imports of breeding stocks, providing production subsidies and tariff/quota protection, and playing a coordinating role between dairy producer cooperatives and dairy processing companies. The Department of Livestock Development and the state enterprise Dairy Farming Promotion Organisation have played a particularly prominent role (Ibid.). Shielded from international competition and supported with production subsidises, milk production began to boom in the



Source: Ministry of Agriculture and Cooperatives, Thailand (n.d.) *Thailand Country Report*

early 1980s (Itsaranuwat and Robinson 2003: 6-7). Dairy farmers – mostly rural small-holders who require assistance in organised milk collection/delivery/processing and technical services – have historically been aggregated into cooperatives, which are today organised under the Ministry of Agriculture and Cooperatives, totalling 114 units in 2001 (Ibid.: 8). About 95 % of the raw milk

produced by small dairy farmers is collected by these local cooperatives and sold directly to the market or to the state-owned and/or private dairy processing companies⁷ (Delgado *et al.* 2003; FAO and APAHCA 2002; Itsaranuwat and Robinson 2003: 6-8; Garcia *et al.* 2005). Notably, the government efforts have been aimed at not only milk production but also consumption. Since 1985, the National Milk Drink Campaign Board and the

⁷ The other 5 percent is sold to local middlemen who tend to offer slightly higher prices (Delgado *et al.* 2003).

National Youth Bureau have carried out a campaign which, with private sector funding, publicised the dietary value of milk under the slogan recognised throughout the country today: “Have you had your milk today?” (Itsaranuwat and Robinson 2003: 7). The introduction of the SMP, which specifies the subsidised milk to be sourced only from domestic production with full contents of Thai raw milk, may be seen as part of this ongoing dairy farming promotion policy of the Thai government.

The National Milk Drinking Campaign Board was established in 1985, following farmers’ protests over unsold milk. A pilot programme was implemented under its initiative in selected areas of Bangkok and Chiangmai, where the parents of primary school and kindergarten children purchased milk at 25% less the normal price through monthly coupons. Suwanabol (n.d.) notes this as the origin of the national SMP. The programme officially started in 1992 to provide 200ml of free milk to all first-year kindergarten children (Chittchang 2005; Suwanabol n.d). In 1995, it was expanded to cover all children up to Grade 1 in public schools. As of 2005, free 200ml milk, costing 5 baht, is provided in the morning to all public kindergarten children and up to Grade 4 students in all public primary schools throughout the 200-250 days of the school year (Chittchang 2005; UNESCO Bangkok n.d.; SRC *et al.* 2000: 143; Jumpatong 2007, personal communication). The programme is expected to cover up to Grade 6 eventually. As of 2005, 6.09 million benefited from the programme (see table below).⁸

The available information suggests that the SMP has two key aims. First, like the SLP, the programme promotes healthy growth of young children, and milk was selected as a supplementary drink for its dietary value (Chittchang 2005; Jumpatong 2007, personal interview and communication). As a related goal, the programme is also intended to improve school attendance with the offer of free milk (Itsaranuwat and Robinson 2003: 7; Jumpatong 2007, personal interviews and communication). On the other hand, the programme has a key function of supporting the dairy industry and the livelihoods of dairy farmers.



Source: Suwanabol (n.d.) *School Milk Programme in Thailand*

⁸ Supplementary milk is also provided by other government agencies such as the BMA, the Department of Local Administration, BPP Command and young child development centres under the Department of Community Development (SRC *et al.* 2000: 143).

It provides an outlet for the produce and further contributes to the creation of the future market by encouraging children to develop a taste for milk from an early age (Suwanabol n.d.; FAO and APHCA 2002; Delgado *et al.* 2003). Recently, the programme has specifically sought to maximise the involvement of local farmers' cooperatives, thereby enhancing its rural development potential. Hence one may say that the SMP operates under a twin goal of promoting nutrition/health and dairy farming/rural development.

4.2. Funding and Governance

The programme was initially implemented by the Ministry of Education, but has since been decentralised and administered by LAOs under the Ministry of Interior (Jumpatong 2007, personal interview). The central government budget is directly allocated, though LAOs, to individual schools which purchase their own milk (see below). The Ministry of Education continues to monitor the programme implementation, whereas the Ministry of Agriculture and Cooperatives oversees the milk supply (Ibid.). The annual budget, beneficiaries, Grades and the number of school days covered by the programme from its inception (1992) to 2003 are shown in the table below:

**SMP Annual Budget, Beneficiaries, Grades and
Number of School Days Covered**

FISCAL YEAR	GRADE	NO. OF STUDENTS	NO. OF DAYS PROVIDED	BUDGET (MILLION BAHT)
1992	Kindergarten	696,625	120	278.60
1993	Kindergarten	1,267,199	120	423.80
1994	Kindergarten	1,623,683	200	1,207.60
1995	K – Grade1	2,802,612	200	1,715.00
1996	K – Grade 2	3,518,192	200	2,213.20
1997	K – Grade 3	5,010,776	200	4,334.77
1998	K – Grade 4	5,389,842	200	5,323.75

1999	K – Grade 4	5,841,732	200	5,356.43
2000	K – Grade 4	5,905,000	200	5,981.35
2001	K – Grade 4	6,224,752	200	6,070.19
2002	K – Grade 4	5,836,286	230	6,752.35
2003	K – Grade 4	5,961,373	230	6,819.03

Note: In 2001, Grade 5 and 6 students with malnutrition problems were included.

(Source: Jumpatong 2007, personal communication)

4.3. Procurement

The procurement mechanism of the programme, like that of the SLP, is scarcely documented. Nevertheless, it appears that it has undergone some significant changes in the recent years (Ibid.). In the last decade, purchasing of school milk was administered at the provincial level, by the provincial educational office. Due to the lack of efficiency and accountability in this system, the procurement policy was subsequently changed to allow individual schools to take responsibility for purchasing milk for themselves according to the programme guidelines. These guidelines required schools to purchase milk from the nearest producers, whether or not they were situated in the same province, and to give priority to local farmers' cooperatives or Agricultural Colleges. This policy has since been further refined in order to prevent intense competition where large cooperatives and companies tend to have a significant advantage over small cooperatives. Under the current system, the country is divided into three school milk zones. The consumers (i.e. children) and the suppliers of milk must be within the same zone, so that raw milk in zone 1 must be processed by a dairy in zone 1 and be consumed by schools in zone 1. This zoning is intended to ensure a balance of supply and demand as well as a more equitable allocation of resources. Dairies wishing to be a school milk supplier must first be certified by the Ministry of Industry, possess a valid food safety certificate from the Thai Food and Drug Administration, and have a long-term contract to buy local raw milk. By 2004, all school milk suppliers must be HACCP (Hazard Analysis and Critical Control Points) certified. All school milk must be made from liquid raw milk and not from powder (Suwanabol n.d.; Jumpatong 2007 personal interview and communication).

Hence in contrast to the SLP, the programme has an explicit emphasis not only on local procurement but also more specifically on procurement of local produce. If the SLP is an implicitly “home grown” programme with informal procurement practices, the SMP may be described as an explicitly “home grown” programme supported with a formal procurement mechanism and policy. Such an explicit emphasis on local sourcing may not have been a feature of the programme in the past, as at least one writer commented in 2003 that local dairy cooperatives played a minimum role in the SMP as most of the milk was procured from “the politically-based business firms in Bangkok” (Delgado *et al* 2003).

4.4. Impact

The impact of the SMP on the national milk consumption and production is worthy of note. The annual per capita milk consumption increased from 2 litres in 1984 to 23 litres in 2002, with the dairy market similarly expanding from 290 million litres a year in the early 1990’s to 1146 million litres by 2003. Local herd size also grew from 132,000 in 1989 to 412,000 in 2003 (Suwanabol n.d.; see also Garcia *et al* 2005: 1). Delgado *et al* (2003) suggests that the growth of the industry between 1993 and 1995 is largely attributable to the programme. School milk accounted for more than 30% of the total liquid milk market around 2003, and the share has since further grown to about 50% (Ibid.; Suwanabol n.d). In short, as Itsaranuwat and Robinson (2003: 7) note, the SMP has “played a key part in promoting milk consumption across the whole country.” This implies positive implications for the livelihoods of small-holder farmers, who make up the majority of the milk producers in Thailand, especially under the current procurement policy favouring local cooperatives. Although no empirical data are available to demonstrate the scale of the impact, a Ministry of Education official confirms that farmers’ cooperatives currently constitute the largest proportion of the school milk suppliers (Jumpatong 2007, personal interview).

As for the nutritional impact, the 1995 Mahidol University evaluation study acknowledged the importance of school milk as a supplementary drink in meeting the nutritional requirements of school feeding (Chittchang 2005). A positive impact on school attendance has also been observed (but not documented) (Jumpatong 2007, personal communication).

5. HRH Princess Maha Chakri Sirindhorn's Agriculture for School Lunch Project

Thailand currently operates one other major school feeding programme. Although it is more or less supplementary in nature, it has a longer history and is implemented in conjunction with the SLP and the SMP in many remote rural schools. Its contribution hence warrants brief attention.

5.1. Project Summary

In 1980, Her Royal Highness Princess Maha Chakri Sirindhorn initiated the Agriculture for School Lunch Project with the aim of alleviating food insecurity and malnutrition among school children in remote rural areas. The project has been implemented in almost every BPP school in combination with the SLP and the SMP. In 2004, it was extended to secondary schools, and today, it targets a total of 478 schools (WFP 2007).

Number of participants in 2004

TODDLER	436
Preschool	17,130
Primary	44,853
Secondary	5,970
Islam	888
Novice	1,720
Total	70,997

(Source: WFP 2007)

The project encourages school agriculture in order to improve the quality and frequency of school lunch in remote rural areas. Under the project, HRH provides agricultural materials/tools, plant seeds, animal breeds, cooking utensils, technical training, budgetary assistance, etc. to facilitate and promote agricultural activities (crop and animal husbandry) by students as part of the curriculum (Ibid.).⁹ The project is not only a food security measure but also

⁹ In some cases in which agricultural activities are not possible, for instance in Child Development Centres and Monastic schools, the Princess provides funding for purchasing

has an educational emphasis, as it aims to equip students with agricultural skills and knowledge to be transferred to their families as well as used in their future career. Most BPP school students come from remote, farming communities, for which such training is likely to be of value (Viravat 2007, personal interview).

The produce of students' agricultural activities is sold to the school cooperative shop and then cooked by parents, students and teachers according to the nutritional guidelines of the project (WFP 2007). The school cooperative purchases the food with the 10 baht-per-child grant available from the SLP. The grant is thus operated as a kind of revolving fund and circulates in the school, with an additional benefit of giving students an opportunity for training in convening cooperative committees, debate and book-keeping. If schools do not produce sufficient food, additional foodstuffs are obtained through community donation or market purchase. Prior to 1992, BPP schools received assistance only from this project. With the introduction of the national SLP and SMP, however, the combination of the three programmes has served to guarantee good quality meals for school children in remote rural areas (Ibid.; Viravat 2007, personal interview).

Community participation is a key element of the project. Children, teachers, parents and other community members cooperate in agricultural activities and meal preparation, which serves to strengthen community networks and cohesion. Schools are envisaged as "learning centres," where community members, along with students and teachers, acquire new agricultural and hygienic skills and knowledge (Ibid.).

The key activity components of the project include:

- School agriculture by using integrated agricultural techniques;
- Meal preparation with the assistance of mothers and community members taking turns under teachers' supervision;
- Promotion of food preservation;
- Provision of iodised drinking water;
- Periodical nutritional surveillance (weight/height measurement and goitre examination);

foodstuffs and powdered cow milk or powdered soy bean milk as supplementary food (WFP 2007).

- Deworming;
- Teacher training in agriculture and nutrition;
- Student training in agricultural techniques, meal preparation, healthy eating, sanitation, etc.; and
- Continuous monitoring and evaluation by concerned agencies.

Despite its longer history, the project covers limited areas and schools in comparison with the SLP and the SMP and plays a more or less supplementary role. From a point of view of local procurement, its scope is rather limited so far as the food used to prepare the meals is produced by students themselves. When additional foodstuffs are purchased, they are usually sourced from markets in towns, some distance away from the BPP schools that are mostly located in remote, mountainous areas (Viravat 2007, personal interview). The significance of the project lies primarily in its nutritional/food security and educational benefits to rural school children rather than immediate socio-economic benefits to local farmers.

6. Conclusion

On the basis of the limited information available for this case study (collected by means of desk research and telephone interviews), it is possible to make the following observations on the potential of and challenges for the SLP and the SMP, especially in relation to their “home grown” elements.

1. The SLP was established and has thus far been implemented with specifically health- and nutrition-related aims. Its scope is expected to broaden and diversify in the future, as the emphasis shifts towards “quality” as well as the wider educational and socio-cultural potential of school feeding;
2. Despite the absence of a clear procurement policy/mechanism, the SLP is (possibly largely) “home grown” in practice, which implies both potential for strengthening/improving current practice and a challenge to facilitate this through appropriate institutional, technical and policy support;
3. Although it has undergone significant improvement, the SLP, as a considerably localised programme, continues to face budgetary

restriction as well as a need for appropriate infrastructural, technical and personnel support and clear national/local government policy;

4. The SMP, in contrast to the SLP, has operated with a twin objective of promoting health/nutrition and supporting dairy farming. Although the available information suggests that the emphasis until recently was on the procurement of national, rather than specifically local, produce, the current policy indicates a clear intention to encourage greater involvement of local milk producers, implying significant “home grown” elements;
5. Despite such existing and potential home-grown elements, the scarcity of empirical data does not permit a valid understanding or measurement of the precise impact of the SLP and the SMP on small-scale local producers. A better understanding of the actual procurement practices and their impact on local producers and rural economies requires further research, especially substantial field work.

6.1. From Quantity to Quality

It seems that the main challenge for the SLP in the future lies in achieving, and further going beyond, the initial aim “just to meet the fundamental concept of having ‘lunch’ in terms of ‘quantity’ through the slogan of ‘everyone – everyday’” (Jumpatong 2007: 2). The programme started with the reduction of child malnutrition as its main objective, in the context of the nation’s ongoing health and nutrition concerns and initiatives. As the central government, LAOs and schools seek variously to cater for all children in need of school lunch to tackle malnutrition, the emphasis thus far has necessarily been on simply ensuring to feed. Since this objective has been more or less achieved, the programme is beginning to widen its scope and explore other potential of school feeding – meal quality (nutritional/hygienic standards), education (nutritional education, agricultural education/training), and socio-cultural benefits (promotion of rice-based culinary culture, strengthening community involvement, etc.) (Jumpatong 2007: 5-6, personal interview). This widening of the scope, nevertheless, is yet to extend to formal recognition of or emphasis on local procurement, as discussed below.

In short, the SLP is a primarily health/nutrition driven programme with a broadening scope.

6.2. Local Procurement and Rural Development

In contrast to the health and nutritional issues which have guided the SLP from its inception, procurement is an issue that is largely left to individual school initiatives and does not receive sufficient policy attention. It has been noted above that despite the absence of formal mechanisms, local sourcing is a common feature of the programme. Nevertheless, while the programme is thus (potentially largely) “home-grown” in practice (out of convenience), the social, economic and environmental implications of procurement practices are not fully recognised. The rural development potential of local sourcing, especially its potential benefits to local/small-holder farmers, is not a priority pursued by the existing programme. The same may be said of the environmental benefits of the procurement of fresh local food (as against processed food, imported food, or food that travels a long distance). This is most likely due to the fact that it is normal practice that serves practical purposes, rather than a novel policy measure, for Thai schools to source fresh local food and cook it on site instead of purchasing imported/processed food. At the same time, it should be noted that the socio-cultural, as well as nutritional, significance of local food consumption is beginning to receive greater attention, as indicated by Jumpatong (2007)’s discussion of the role of rice-based school lunch in the promotion of cultural heritage and healthy eating. Thus, one of the challenges for the future seems to be to have appropriate policies and administrative mechanisms in place to ensure that the SLP realises the full potential and benefits of local food procurement and consumption, for instance, by maximising the participation of local farmers, as has been attempted in the SMP.

The SLP is a primarily health/nutrition driven programme with potentially significant, yet undocumented and perhaps unintended, “home grown” elements.

6.3. Budgetary and Policy issues

While it has largely achieved its initial goal, with 95% of school children having lunch every day, the SLP continues to face a number of programme implementation challenges. Jumpatong (2007: 3) points out that in many schools, children only receive coupons to purchase food outside the school, and consequently that the school loses all control over the nutritional quality and quantity of the food served to children, as well as the opportunity for food education. This seems to indicate that due to the budgetary constraints and the lack of facilities, equipment and personnel, as well as the absence of clear procurement mechanisms and policy at national/local government levels, individual schools are left with much of the pressure of feeding children in

need within the confines of whatever human, physical and financial resources available to them. While school agricultural activities and community participation play an important supplementary role, achieving the wider programme goals requires greater budgetary, infrastructural, technical and personnel support and clear national/local government policy.

The SLP is a state-subsidised programme with localised implementation in need of increased funding as well as a supportive institutional/policy framework.

6.4. School Milk and Local Procurement

The SMP appears to differ significantly from the SLP in its focus on – initially national, and more recently local – procurement. The programme originally specified the subsidised school milk to be sourced only from domestic production, whether the suppliers were large state-owned/private dairy companies based in urban areas or local farmers’ cooperatives. This policy was subsequently revised with a more specific emphasis on milk of local provenance and the involvement of local farmers’ cooperatives. Thus the programme currently operates under a clear local procurement policy and a supporting administrative system. In addition to the supplementary nutritional value of fresh milk, the programme has had significant economic benefits; it has greatly contributed to the development of the national dairy industry as a whole, and more recently, to the creation/sustenance of milk markets and income generation opportunities for local farmers and cooperatives. Jumpatong (2007, personal interview) endorses the positive impact of the programme on local small-holder farmers’ livelihoods, although such impact has not been formally studied to date

The SMP, in contrast to the SLP, is guided by a double emphasis on promoting both health/nutrition and dairy farming. Its current local procurement policy implies significant “home grown” elements and rural development potential.

6.5. Scarcity of Data: Challenge for Future Research

The available information suggests that both the SLP and the SMP are “home grown” to a considerable extent and may have significant positive impact on rural economies in general and the livelihoods of small-holder farmers in particular (although the “home grown” elements of the former are unintended). However, the scale and details of such impact remain unknown due to the unavailability of information and the absence of previous research. An appropriate understanding of both programmes (as well as the

supplementary importance of the Agriculture for School Lunch Project) can only be obtained with comprehensive further research, especially a review of Thai literature (since much information is available only in Thai) and field research. In addition to updating the nutritional impact of the SLP and the SMP, future research may focus on, among other things:

- The evolution of the governance and procurement mechanisms;
- The details of actual procurement practices and budgetary, infrastructural, technical and personnel support;
- The extent of the involvement of, and the socio-economic benefits to, local small-holder farmers and cooperatives;
- The wider rural development impacts (such as the impact on agricultural/dairy production at local/regional levels); and
- The educational and socio-cultural impacts.

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Dietary Habits Are Associated With School Performance in Adolescents

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Abstract: Several studies suggest that dietary habits are associated with poor academic performance. However, few studies have evaluated these relations after adjusting for numerous confounding factors. This study evaluated the frequency of various diet items (fruit, soft drinks, fast foods, instant noodles, confections, vegetables, and milk) and the regularity of meal times (breakfast, lunch, and dinner) all at once.

A total of 359,264 participants aged from 12 to 18 years old were pooled from the Korea Youth Risk Behavior Web-based Survey (KYRBWS) for the 2009 to 2013 period. Dietary habits over the last 7 days were surveyed, including the regularity of consuming breakfast, lunch and dinner and the frequency of eating fruits, soft drinks, fast foods, instant noodles, confections, vegetables, and milk. Physical activity, obesity, region of residence, subjective assessment of health, stress level, economic level, and parental education level were collected from all of the study participants. School performance was classified into 5 levels. The adjusted odds ratios (AORs) of dietary habits for school performance were analyzed using multinomial logistic regression analyses with complex sampling. Structural equation modeling was used to analyze the effects of diet factors on school performance while considering the effects of other variables on both diet factors and school performance.

Frequent intakes of breakfast (AOR = 2.34, 95% confidence interval [CI] = 2.20–2.48), fruits (AOR = 1.73, 95% CI = 1.62–1.86), vegetables (AOR = 1.48, 95% CI = 1.37–1.61), and milk (AOR = 1.35, 95% CI = 1.28–1.43) were related to high levels of school performance (each with $P < 0.001$). In contrast, soft drinks (AOR = 0.42, 95% CI = 0.38–0.46), instant noodles (AOR = 0.62, 95% CI = 0.55–0.70), fast food (AOR = 0.83, 95% CI = 0.72–0.96), and confectionary (AOR = 0.86, 95% CI = 0.80–0.93) were negatively associated with school performance (each with $P < 0.001$).

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This study confirms previous studies of school performance and dietary habits that find a positive association with eating breakfast and consuming fruits and milk and a negative relation with soft drinks, instant noodles, fast foods, and confections.

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Abbreviations: AOR = adjusted odds ratio, CI = confidence interval, KCDC = Centers for Disease Control and Prevention of Korea, KYRBWS = Korea Youth Risk Behavior Web-based Survey, SES = socioeconomic status.

INTRODUCTION

Various factors, such as physical activity, obesity, stress, and income level, are related to school performance in previous studies.^{1,2} Stress levels and parental factors (parental education levels, aspirations for their children's school performance, and family income) are also related to the school performance of their children.^{3,4} Dietary habits are also associated with school performance. For example, fast foods affect academic performance.⁵ These foods are notorious for their poor nutrient quality, and they often do not meet nutrient guidelines.⁶ Moreover, >50% of fast food meals exceed recommendations for sodium, and <25% of these meals met guidelines for *trans* fats. Less than 1/3 of fast food meals provided adequate calcium and iron, and <20% provided adequate vitamin A.⁶ Insufficient nutrient intakes, particularly of iron, and high intakes fat and added sugar due to frequent fast food meal consumption are known to be associated with poor school performance and metabolic diseases, such as insulin resistance and obesity in other studies of children.^{5,7,8} The frequent skipping of breakfast is another dietary habit that may have detrimental effects on adolescents, and children show enhanced spatial and/or short-term memory after eating breakfast, probably due to the facilitated blood glucose response following a meal.⁹ Several studies emphasize the importance of eating breakfast for cognition and learning due to the gradual release of energy for brain function and intakes of micronutrients, particularly iron, iodine, and vitamin A, irrespective of other covariates, including behavioral factors in children and adolescents.^{10,11} Diet habits are important in adolescents because they have high brain metabolic needs. Brain glucose consumption is higher in children until the age of 16 to 18 years than in adults.¹² Furthermore, both the nutritional components of each food and the overall quality of diet, as represented by high diet quality index values or healthy dietary habits, are suggested to be related to academic performance.¹³ This is because overall diet quality may reflect one's socioeconomic status (SES) and other personal characteristics that could influence academic performance.

The present study was aimed at analyzing the dietary habits that are related to school performance. We were especially concerned with the frequency of fast food, instant noodle, and

confection consumption, as well as the regularity of meal times and patterns such as skipping breakfast, which are common among adolescents. Several demographic and socioeconomic factors, as well as dietary habits, were considered in this study. These adjustment strategies enable us to identify the relations between dietary habits and academic performance more clearly. Moreover, we reciprocally adjusted the dietary factors themselves. Our search revealed no study that simultaneously evaluated the associations among the consumption of fruits, soft drinks, fast foods, instant noodles, confections, vegetables and milk, regular consumption breakfast, lunch, and dinner and academic performance among adolescents. Based on a large, representative population-based dataset, we could obtain reliable results for the associations between each dietary habit and academic performance.

MATERIALS AND METHODS

Study Population and Data Collection

The Institutional Review Board of the Centers for Disease Control and Prevention of Korea (KCDC) approved this study (2014-06EXP-02-P-A). Written informed consent was obtained from each participant prior to the survey. As this web based survey was performed at the school with huge participants, the informed consent from their parents was exempted. This consent procedure was approved by the IRB of KCDC.

This study is a cross-sectional study using data from the Korea Youth Risk Behavior Web-based Survey (KYRBWS). This study covers one nation using statistical methods based on designed sampling and adjusted weighted values. The KYRBWS waves conducted in 2009, 2010, 2011, 2012, and 2013 were analyzed. The data were collected by the KCDC. Korean adolescents from 7th through 12th grades completed the self-administered questionnaire voluntarily and anonymously. The validity and reliability of the KYRBWS has been documented by other studies.^{14,15} Using 43 regions (considering the administrative district, geographic accessibility, number of schools, and population size) and schools, the population was stratified into 129 levels for sample distribution and then the sample was selected using stratified, 2-stage (schools and classes) clustered sampling based on Education Ministry data. The teachers of the selected classes registered the number of participants online. Then students were then asked to participate in the survey using school's internet access. Sampling was weighted by statisticians, who performed poststratification and considered both nonresponse rates and extreme values. Detailed methods were described on the KYRBWS website (<http://yhs.cdc.go.kr/>).

Of 370,568 participants, we excluded the following from the study: those who did not record their height or weight (11,303 participants) and those who did not provide the educational level of their mother (1 participant). A total of 359,264 participants (184,801 males and 174,463 females) from 12 to 18 years old were included in this study (Figure 1).

Survey

Days of physical activity were measured as the days on which exercise lasted more than 60 minutes and was vigorous enough to raise the heart rate or respiration over the past 7 days.¹⁶ Obesity was categorized into 4 groups according to the Centers for Disease Control and Prevention guidelines for body mass index (kg/m^2) for children and teens¹⁷: obese ≥ 95 th percentile; overweight ≥ 85 th and < 95 th percentile;

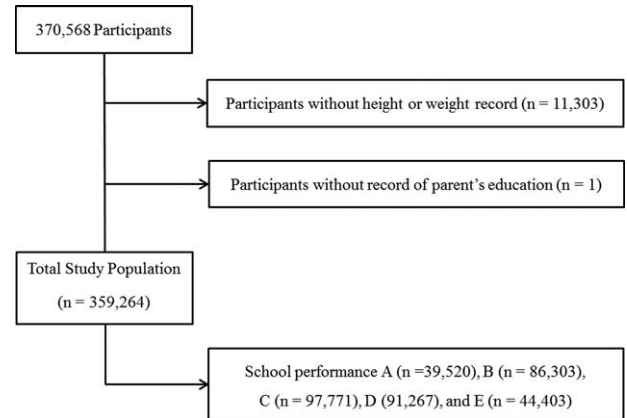


FIGURE 1. A schematic illustration of participant selection in this study. Of 370,568 participants, those with incomplete records were excluded. Data for a total of 359,264 participants from whom complete data were obtained were analyzed.

healthy weight ≥ 5 th and < 85 th percentile; and underweight < 5 th percentile. The regions of residence were classified into 3 groups by administrative district: large city, small city, and rural area. Participants were asked to classify their subjective self-assessment of health into 5 grades: very good, good, normal, not good, and very bad. Participants classified their stress level into 5 categories: I feel a lot of stress, I feel some stress, I feel a little stress, I rarely feel stress, and I do not feel stress. Participants were asked about the economic status of their family based on 5 levels ranked from the highest to the lowest. The parental education level was surveyed based on 4 categories: graduated college or over, graduated high school, graduated middle school or under, and unknown or no parent. The participants who do not know the educational level of their parents or who had no parents were not excluded because this could increase the missing values among relatively lower economic level participants. The regularity of meal time was surveyed based on the days that breakfast, lunch, and dinner were consumed over the past 7 days, as divided into 4 groups: 6 to 7 times a week; 3 to 5 times a week; 1 to 2 times a week; and 0 times a week. Drinking only a cup of juice or milk was not counted as having eaten breakfast, lunch, or dinner. Participants were also asked the frequency of eating fruits (not fruit juices), soft drinks, fast foods (such as pizza, hamburgers, or chicken), instant noodles, confections, vegetables, and milk over the last 7 days, and the responses were divided into 4 groups: ≥ 7 times a week; 3 to 6 times a week; 1 to 2 times a week; and 0 times a week. The participants were asked about their academic performance in their grade at school over the last 12 months. School performance was divided into 5 levels: A (highest), B (middle, high), C (middle), D (middle, low), and E (lowest).

Statistical Analysis

The differences in general characteristics affecting performance at school were calculated using ANOVA for age and days of physical activity; Chi-square tests were used for sex, obesity, region of residence, subjective health, stress level, economic level, education level of father, education level of mother, regularity of breakfast, lunch, dinner and frequency of fruit, soft drink, fast food, instant noodle, confection, vegetable, and milk consumption (Tables 1 and 2).

TABLE 1. General Characteristics of Participants According to Performance at School

Factors	Total	Performance at School					P-Value
		A	B	C	D	E	
Number							
n		359,264	39,520	86,303	97,771	91,267	44,403
%		100	11.0	24.0	27.2	25.4	12.4
Mean age (year, SD)	15.0 (1.7)	14.8 (1.7)	14.9 (1.7)	15.1 (1.8)	15.0 (1.7)	15.0 (1.8)	<0.001*
Physical activity (d, SD)	1.69 (2.0)	1.91 (2.0)	1.71 (1.9)	1.65 (1.9)	1.64 (1.9)	1.65 (2.0)	<0.001*
Sex, %							<0.001†
Male	51.4	57.4	50.5	50.5	49.7	53.6	
Female	48.6	42.6	49.5	49.5	50.3	46.4	
Obesity, %							<0.001†
Underweight	6.8	6.6	6.4	6.7	6.9	7.7	
Healthy	79.9	80.9	81.0	80.6	78.7	77.4	
Overweight	10.3	9.8	9.9	9.9	11.0	11.1	
Obese	3.0	2.7	2.7	2.8	3.3	3.8	
Region, %							<0.001†
Large city	47.2	49.7	48.8	47.3	46.0	44.4	
Small city	40.2	38.4	39.2	40.4	41.3	41.4	
Rural area	12.5	11.8	12.1	12.3	12.8	14.1	
Subjective health, %							<0.001†
Very good	18.9	23.8	18.6	18.5	17.5	19.1	
Good	47.5	48.5	51.2	49.1	45.9	39.4	
Normal	26.3	21.4	23.8	26.3	28.7	30.5	
Bad	6.9	5.9	6.2	5.8	7.6	10.1	
Very bad	0.4	0.4	0.2	0.3	0.3	0.9	
Stress, %							<0.001†
Severe	12.1	10.7	9.8	10.3	12.8	20.1	
Moderate	30.4	26.5	29.2	30.0	32.7	32.8	
Mild	41.3	41.4	43.6	43.6	40.3	33.7	
A little	13.8	17.3	15.3	13.9	12.3	10.6	
No	2.4	4.0	2.2	2.2	1.9	2.7	
Economic level, %							<0.001†
Highest	6.3	22.6	6.5	3.4	3.2	3.9	
Middle high	23.1	30.3	34.8	21.6	15.8	12.1	
Middle	47.5	33.3	42.4	56.0	51.7	42.8	
Middle low	17.8	10.6	13.7	16.0	23.7	24.0	
Lowest	5.3	3.1	2.6	2.9	5.6	17.2	
Education, father, %							<0.001†
Unknown	17.5	9.8	11.6	16.3	21.5	30.1	
Middle school	5.1	3.6	4.3	4.9	5.9	6.9	
High school	35.2	26.5	33.3	36.9	38.6	36.2	
College, or over	42.2	60.1	50.8	41.9	34.0	26.8	
Education, mother, %							<0.001†
Unknown	17.3	9.5	11.3	16.0	21.3	30.4	
Middle school	5.0	3.5	4.1	4.9	5.9	6.3	
High school	45.3	37.5	45.0	47.4	47.7	43.4	
College, or over	32.4	49.5	39.6	31.6	25.1	19.9	

* ANOVA test for the analysis of mean age and physical activity. Significance at $P < 0.05$.† Chi-square test for the analysis of sex, obesity, region of residence, subjective health, stress level, economic level, education level of father, and education level of mother. Significance at $P < 0.05$.

Multinomial logistic regression with complex sampling adjusted for age, sex, obesity, region of residence, subjective health, stress level, economic level, education level of father, education level of mother, frequency of breakfast, lunch, dinner, and fruit, soft drink, fast food, instant noodle, confectionary, vegetable, and milk consumption (Table 3). Two-tailed tests were conducted and P -values lower than 0.05 were considered

to indicate significance. Adjusted odd ratios (AORs) and 95% confidence intervals (CIs) were calculated. After applying the weighted values recommended by the KYRBWS, all results are presented as weighted values. The data were analyzed statistically using SPSS ver. 21.0 (IBM, Armonk, NY).

Structural equation modeling was used to explain the effects of diet factors on school performance while considering

TABLE 2. Diet Habit Rates of Participants According to Performance at School

Factors	Total	Performance at School					P-Value
		A	B	C	D	E	
Breakfast, %							<0.001*
6–7 times a week	53.0	67.8	61.9	53.8	45.3	36.3	
3–5 times a week	21.5	16.1	19.3	22.1	24.3	23.9	
1–2 times a week	13.7	8.4	10.2	13.4	16.6	20.1	
0 time a week	11.8	7.8	8.6	10.7	13.8	19.7	
Lunch, %							<0.001*
6–7 times a week	80.1	86.6	85.7	81.5	76.4	67.6	
3–5 times a week	9.6	6.0	7.0	9.0	11.7	15.1	
1–2 times a week	5.1	3.2	3.1	4.6	6.1	9.4	
0 time a week	5.2	4.2	4.2	4.9	5.7	7.8	
Dinner, %							<0.001*
6–7 times a week	72.5	81.8	78.9	74.1	67.4	59.3	
3–5 times a week	16.3	10.7	13.2	15.6	19.5	22.4	
1–2 times a week	6.2	3.6	4.0	5.7	7.8	10.9	
0 time a week	4.9	3.9	3.9	4.6	5.3	7.4	
Fruit, %							<0.001*
≥7 times a week	20.4	28.7	22.6	20.1	17.1	15.9	
3–6 times a week	40.0	41.5	42.9	41.4	38.6	32.9	
1–2 times a week	30.7	23.7	27.6	30.7	34.0	36.4	
0 time a week	8.9	6.1	6.8	7.8	10.2	14.8	
Soft drink, %							<0.001*
≥7 times a week	4.4	3.4	2.9	3.8	4.9	8.3	
3–6 times a week	19.8	16.4	17.1	18.9	22.0	25.4	
1–2 times a week	45.7	45.5	46.3	46.5	45.7	42.7	
0 time a week	30.2	34.7	33.7	30.8	27.5	23.7	
Fast food, %							<0.001*
≥7 times a week	1.4	1.3	0.8	1.2	1.5	2.8	
3–6 times a week	10.4	8.5	8.6	9.9	11.3	14.5	
1–2 times a week	52.1	51.6	52.6	52.7	52.2	50.3	
0 time a week	36.1	38.6	37.9	36.2	34.9	32.4	
Instant noodle, %							<0.001*
≥7 times a week	2.3	1.8	1.4	2.0	2.7	4.6	
3–6 times a week	21.5	17.0	18.6	20.6	23.9	28.1	
1–2 times a week	48.6	49.6	50.4	49.5	47.7	44.1	
0 time a week	27.6	31.5	29.6	27.9	25.8	23.3	
Confectionary, %							<0.001*
≥7 times a week	6.8	6.2	5.8	6.4	7.2	9.6	
3–6 times a week	35.5	34.1	35.6	35.8	36.2	34.8	
1–2 times a week	41.1	41.3	41.8	41.7	40.7	39.1	
0 time a week	16.5	18.4	16.8	16.1	15.9	16.5	
Vegetable, %							<0.001*
≥7 times a week	43.0	50.3	46.8	42.9	39.7	35.8	
3–6 times a week	38.8	35.0	38.1	40.2	40.3	37.7	
1–2 times a week	14.8	11.5	12.5	14.1	16.4	20.3	
0 time a week	3.4	3.2	2.6	2.8	3.6	6.2	
Milk, %							<0.001*
≥7 times a week	29.3	36.1	31.2	28.8	27.0	25.6	
3–6 times a week	36.0	35.8	37.1	36.7	35.7	32.9	
1–2 times a week	20.9	17.0	19.4	21.1	22.5	23.8	
0 time a week	13.8	11.1	12.3	13.5	14.9	17.8	

* Chi-square test for the analysis. Significance at $P < 0.05$.

effects of other variables on both diet factors and school performance.¹⁸ Age, body mass index, subjective health status, and physical activity were defined as personal factors. Region of residence, economic status, and education level of parents were

defined as SES. Frequency of meals and intake of various items were defined as the diet factors. Score was defined as school performance. Personal factors and SES were set as the exogenous variables, while diet factors and school performance were

TABLE 3. Adjusted Odd Ratios of Dietary Habit for School Performance Using Multinomial Logistic Regression Analysis With Complex Sampling

Factors	Performance at School					P-Value
	A	B	C	D	E	
Breakfast, %						<0.001*
6–7 times a week	2.34 (2.20–2.48)	1.99 (1.90–2.10)	1.67 (1.60–1.75)	1.29 (1.23–1.35)	1	
3–5 times a week	1.36 (1.29–1.45)	1.37 (1.30–1.44)	1.35 (1.29–1.41)	1.20 (1.14–1.25)	1	
1–2 times a week	1.12 (1.05–1.19)	1.14 (1.08–1.20)	1.19 (1.14–1.25)	1.12 (1.07–1.17)	1	
0 time a week	1	1	1	1		
Lunch, %						<0.001*
6–7 times a week	1.12 (1.00–1.26)	1.17 (1.07–1.28)	1.16 (1.07–1.26)	1.13 (1.04–1.22)	1	
3–5 times a week	0.72 (0.64–0.81)	0.81 (0.74–0.88)	0.95 (0.87–1.03)	1.02 (0.94–1.11)	1	
1–2 times a week	0.74 (0.65–0.84)	0.72 (0.65–0.79)	0.85 (0.78–0.93)	0.89 (0.82–0.97)	1	
0 time a week	1	1	1	1		
Dinner, %						<0.001*
6–7 times a week	1.38 (1.22–1.55)	1.22 (1.11–1.33)	1.08 (0.99–1.17)	1.07 (0.84–1.16)	1	
3–5 times a week	0.86 (0.76–0.97)	0.86 (0.79–0.94)	0.84 (0.77–0.92)	0.98 (0.91–1.07)	1	
1–2 times a week	0.84 (0.74–0.95)	0.83 (0.76–0.91)	0.87 (0.80–0.95)	1.00 (0.92–1.08)	1	
0 time a week	1	1	1	1		
Fruit, %						<0.001*
≥7 times a week	1.73 (1.62–1.86)	1.49 (1.41–1.57)	1.43 (1.36–1.50)	1.18 (1.12–1.24)	1	
3–6 times a week	1.58 (1.48–1.68)	1.54 (1.47–1.62)	1.47 (1.40–1.53)	1.26 (1.21–1.31)	1	
1–2 times a week	1.16 (1.09–1.24)	1.20 (1.14–1.26)	1.20 (1.15–1.26)	1.14 (1.09–1.18)	1	
0 time a week	1	1	1	1		
Soft drink, %						<0.001*
≥7 times a week	0.42 (0.38–0.46)	0.44 (0.41–0.47)	0.55 (0.52–0.59)	0.72 (0.68–0.76)	1	
3–6 times a week	0.59 (0.56–0.62)	0.62 (0.59–0.64)	0.70 (0.67–0.73)	0.84 (0.80–0.87)	1	
1–2 times a week	0.79 (0.76–0.82)	0.80 (0.77–0.82)	0.85 (0.82–0.88)	0.93 (0.90–0.96)	1	
0 time a week	1	1	1	1		
Fast food, %						<0.001*
≥7 times a week	0.83 (0.72–0.96)	0.63 (0.55–0.72)	0.79 (0.70–0.89)	0.81 (0.73–0.80)	1	
3–6 times a week	0.75 (0.70–0.79)	0.73 (0.69–0.76)	0.79 (0.75–0.83)	0.82 (0.78–0.86)	1	
1–2 times a week	0.97 (0.94–1.01)	0.94 (0.91–0.97)	0.95 (0.92–0.98)	0.95 (0.92–0.98)	1	
0 time a week	1	1	1	1		
Instant noodle, %						<0.001*
≥7 times a week	0.62 (0.55–0.70)	0.62 (0.56–0.68)	0.78 (0.71–0.85)	0.86 (0.80–0.94)	1	
3–6 times a week	0.67 (0.64–0.71)	0.77 (0.74–0.80)	0.83 (0.80–0.86)	0.89 (0.86–0.92)	1	
1–2 times a week	0.94 (0.90–0.98)	0.98 (0.94–1.01)	0.99 (0.95–1.02)	0.98 (0.95–1.02)	1	
0 time a week	1	1	1	1		
Confectionary, %						<0.001*
≥7 times a week	0.86 (0.80–0.93)	0.86 (0.81–0.91)	0.88 (0.83–0.94)	0.95 (0.90–1.01)	1	
3–6 times a week	1.09 (1.03–1.14)	1.07 (1.02–1.11)	1.05 (1.01–1.09)	1.06 (1.02–1.11)	1	
1–2 times a week	1.04 (0.99–1.09)	1.05 (1.01–1.09)	1.05 (1.01–1.09)	1.04 (1.00–1.08)	1	
0 time a week	1	1	1	1		
Vegetable, %						<0.001*
≥7 times a week	1.48 (1.37–1.61)	1.72 (1.61–1.85)	1.69 (1.59–1.81)	1.47 (1.38–1.56)	1	
3–6 times a week	1.24 (1.14–1.34)	1.50 (1.40–1.60)	1.61 (1.50–1.72)	1.42 (1.33–1.51)	1	
1–2 times a week	1.01 (0.93–1.11)	1.18 (1.10–1.27)	1.25 (1.16–1.34)	1.21 (1.14–1.29)	1	
0 time a week	1	1	1	1		
Milk, %						<0.001*
≥7 times a week	1.35 (1.28–1.43)	1.28 (1.22–1.34)	1.23 (1.17–1.28)	1.16 (1.11–1.21)	1	
3–6 times a week	1.35 (1.28–1.42)	1.32 (1.26–1.37)	1.26 (1.21–1.31)	1.17 (1.13–1.22)	1	
1–2 times a week	1.06 (1.00–1.12)	1.06 (1.02–1.11)	1.07 (1.03–1.12)	1.06 (1.02–1.10)	1	
0 time a week	1	1	1	1		

* Significance at $P < 0.05$.

defined as the endogenous variables. Standardized regression weights were measured, and standardized total effects, direct effects, and indirect effects were calculated (Tables 4 and 5). The results were analyzed using SPSS Amos ver. 21.0.

RESULTS

The demographic characteristics are summarized in Table 1. Reporting higher physical activity, being male, reporting a healthy weight, living in a large city, feeling subjectively healthy, feeling lower stress, being at a higher economic level, and having higher parental educational levels were associated with higher school performance (each with $P < 0.001$).

Diet habits are summarized in Table 2. The regularity of consuming breakfast, lunch, and dinner and frequency of fruit, vegetable, and milk intake were associated with higher school performance, while frequent intakes of soft drinks, fast foods, instant noodles, and confections were linked with poor school performance (each with $P < 0.001$). To evaluate possible associations among various dietary habits, we conducted a correlation analysis and confirmed that most of the Phi coefficients were very small (less than <0.3) (see Table S1, Supplemental Content, <http://links.lww.com/MD/A845>, which illustrates the Phi correlations among eating behaviors).¹⁷

We performed a multinomial logistic regression analysis adjusting for confounding factors (Table 3). In group A, compared with never eating breakfast, eating breakfast frequently showed a high AOR with a dose–response relationship (1–2 times AOR = 1.12, 95% CI = 1.05–1.19; 3–5 times AOR = 1.36, 95% CI = 1.29–1.45; 6–7 times AOR = 2.34, 95% CI = 2.20–2.48, $P < 0.001$). Other school performance groups (B–D) also showed dose–response relationships eating breakfast ($P < 0.001$). In group A, having lunch and dinner 6 to 7 times a week showed high AORs of 1.12 (95% CI = 1.00–1.26) and 1.38 (95% CI = 1.22–1.55), respectively (each with $P < 0.001$). However, reporting less than 6 meal times a week showed a negative relation with school performance for both lunch (1–2 times AOR = 0.74, 95% CI = 0.65–0.84; 3–5 times AOR = 0.72, 95% CI = 0.64–0.81, $P < 0.001$) and dinner (1–2 times AOR = 0.84, 95% CI = 0.74–0.95; 3–5 times AOR = 0.86, 95% CI = 0.76–0.97, $P < 0.001$).

Compared with never eating fruit, eating more was associated with group A school performance with a dose–response relationship (1–2 times AOR = 1.16, 95% CI = 1.09–1.24; 3–6 times AOR = 1.58, 95% CI = 1.48–1.68; ≥ 7 times AOR = 1.73, 95% CI = 1.62–1.86, $P < 0.001$). Similarly, frequent milk consumption was related to group A performance with a dose–response relationship (1–2 times AOR = 1.06, 95% CI = 1.00–1.12; 3–6 times AOR = 1.35, 95%

TABLE 4. Standardized Regression Weight in Structural Equation Model

Association	Estimate	P-Value
Personal factors → diet factors	0.046	$<0.001^*$
Personal factors → school performance	0.141	$<0.001^*$
Social economic status → diet factors	0.140	$<0.001^*$
Social economic status → school performance	0.268	$<0.001^*$
Diet factors → school performance	0.125	$<0.001^*$

* Significance at $P < 0.05$.

TABLE 5. Standardized Total Effect, Direct Effect, and Indirect Effect in Structural Equation Model

	Total Effect	Direct Effect	Indirect Effect
Personal factors → diet factors	0.046	0.046	0.000
Personal factors → school performance	0.146	0.141	0.006
Social economic status → diet factors	0.140	0.140	0.000
Social economic status → school performance	0.285	0.268	0.017
Diet factors → school performance	0.125	0.125	0.000

CI = 1.28–1.42; ≥ 7 times AOR = 1.35, 95% CI = 1.28–1.43, $P < 0.001$). Frequent eating of vegetables was also associated with school performance with a dose–response relationship (1–2 times AOR = 1.01, 95% CI = 0.93–1.11; 3–6 times AOR = 1.24, 95% CI = 1.14–1.34; ≥ 7 times AOR = 1.48, 95% CI = 1.37–1.61, $P < 0.001$). However, consuming more soft drinks (1–2 times AOR = 0.79, 95% CI = 0.76–0.82; 3–6 times AOR = 0.59, 95% CI = 0.56–0.62; ≥ 7 times AOR = 0.42, 95% CI = 0.38–0.46) and instant noodles (1–2 times AOR = 0.94, 95% CI = 0.90–0.98; 3–6 times AOR = 0.67, 95% CI = 0.64–0.71; ≥ 7 times AOR = 0.62, 95% CI = 0.55–0.70) was negatively associated with school performance with a dose–response relationship (each with $P < 0.001$). Frequent fast food consumption was also negatively linked with school performance (1–2 times AOR = 0.97, 95% CI = 0.94–1.01; 3–6 times AOR = 0.75, 95% CI = 0.70–0.79; ≥ 7 times AOR = 0.83, 95% CI = 0.72–0.96, $P < 0.001$). Although eating confections less than 7 times a week did not show an evident negative relation with school performance, eating them ≥ 7 times a week was negatively associated with school performance (≥ 7 times AOR = 0.86, 95% CI = 0.80–0.93, $P < 0.001$).

Standardized regression weights (direct effects) are calculated. The estimated values of personal factors to diet factor, personal factors to school performance, SES to diet factors, SES to school performance, and diet factors to school performance were 0.046, 0.141, 0.140, 0.268, and 0.125, respectively (each with $P < 0.001$) (Table 4) (Figure 2).

The standardized total effects were calculated using direct and indirect effects. The total effects of personal factors to diet factor, personal factors to school performance, SES to diet factors, SES to school performance, and diet factors to school performance were 0.046, 0.146, 0.140, 0.285, and 0.125, respectively (Table 5) (Figure 2).

DISCUSSION

We found that the regular consumption of breakfast and frequent intake of fruits, vegetables, and milk contributed to high levels of school performance to varying degrees. Conversely, any frequency of soft drink, instant noodle, fast food intake, and eating confections ≥ 7 times a week negatively affected school performance. These relations between dietary habits and school performance were maintained after considering interactions with personal, socioeconomic, and dietary factors. To date, no study has comprehensively analyzed the dietary habits that are related to school performance after

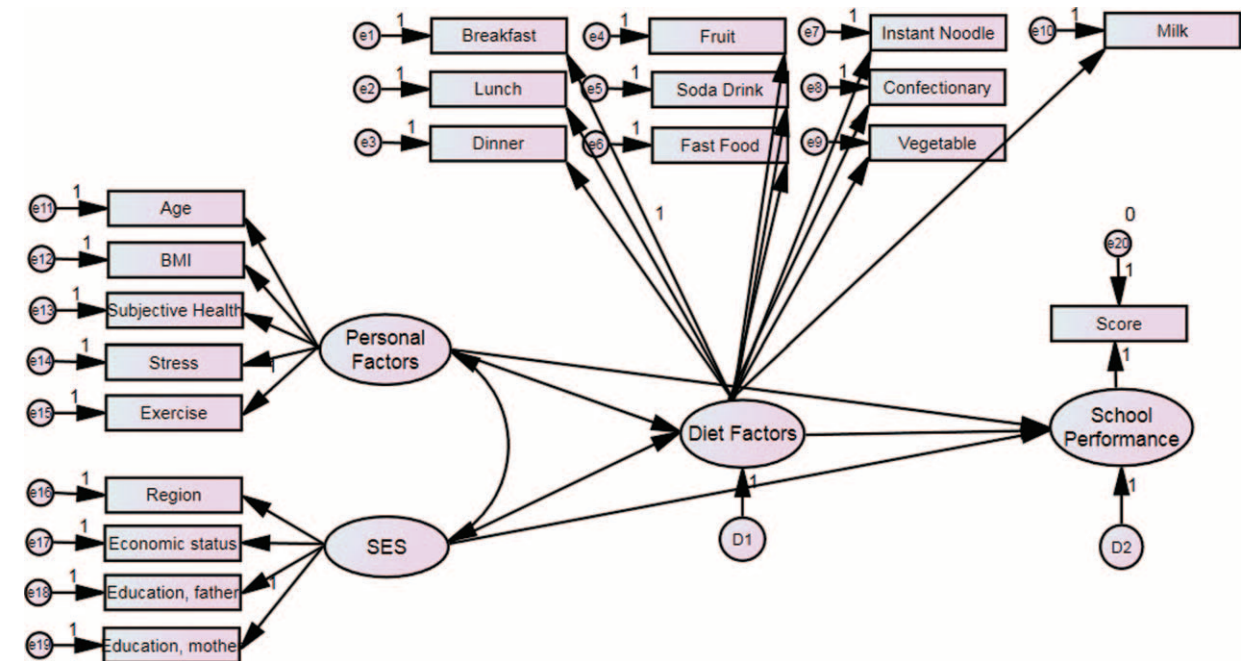


FIGURE 2. Structural equation modeling was used to explain the effects of diet factors on school performance while considering the effects of other variables on diet factors and school performance.

considering various factors. Moreover, this is the 1st study of the correlations between dietary intakes and school performance among Korean adolescents.

Of the participants, 11.8% consumed fast food more than 3 times a week in this study. This figure is comparable to that previously reported by the International Study of Asthma and Allergies in Children, which estimated that 13% of adolescents consumed fast food more than 3 times a week.¹⁹ As fast food generally contains poor nutrient content, as mentioned in the introduction, there are several concerns about the adverse outcomes of fast food. It is known that poor nutritional intakes that do not satisfy the recommended daily allowances for macro- and micronutrients are associated with significantly poorer attendance, punctuality, and grades at school, as well as with more behavior problems. These problems could be improved by adequate nutrition support in other studies of children.^{2,20} The poor nutritional composition of fast foods, which contain high amounts of fats and carbohydrates, may influence poor school performance. In animal and adult human studies, high fat and high carbohydrate diets are suggested to have detrimental effects on cognitive function, even after acute exposure over several days.^{21–23} Short-term ingestion of a high-fat diet (55% kcal from fat) impairs exercise capacity and cognitive function in both animal and adult human studies.^{21,23} Moreover, in animal studies, increased expression of genes related to inefficient fatty acid oxidation, such as uncoupling protein levels in mitochondria, are observed.²¹ These uncoupling proteins diminish metabolic efficiency (ATP production/O₂ consumption), thereby impairing endurance performance.²¹ As fat cannot permeate the blood–brain barrier, substrate deprivation for energy production in the brain and insulin resistance are suggested as plausible mechanisms for the impaired cognitive function observed with high-fat diets.²⁴ However, adults who consume high carbohydrate meals (54% kcal from carbohydrate) showed longer reaction times in cognitive performance

tasks than those who consumed balanced meals, probably due to the increased availability of tryptophan to the serotonergic neurons involved in the sedative effect.²² A recent study experimentally proved that high saturated fat and refined carbohydrate diets induce impaired function in the frontal, limbic, and hippocampal systems, which perform learning, memory, and cognition functions.²⁵ Several theories, including dietary-induced reductions in brain-derived neurotrophic factor (BDNF), oxidative stress, neuroinflammation, and an impaired blood–brain barrier, explain impaired brain function.²⁵ Consistent with these theories, this study showed that fast food intake was related to poor school performance. Similarly, high carbohydrate foods, such as soft drinks and instant noodles, showed negative correlations with school performance in this study.

The relation between confections and school performance was inconsistent in this study. In 1 student study (9–22 years), it was reported that the intake of confections in the afternoon improved spatial memory, although there was contradictory results for attention.²⁶ An afternoon snack may prevent starvation during daytime, which may impair brain function. However, confections are composed of refined carbohydrates or sugars,²⁷ which were suggested to impair the frontal, limbic, and hippocampal systems, as well as their associated functions in learning, memory, and cognition if it is surfeited.²⁸ Consuming confections more than 6 times a week was negatively related to school performance in this study (Table 3).

Fruits and vegetables were related to high levels of school performance. In children, a previous study demonstrated a significant correlation between executive cognitive function and snack foods but not with fruit or vegetable intakes, probably due to the small study sample and the limited number of variables considered, which might obscure the relations between fruit and vegetable consumption and executive cognitive function.²⁹ However, several studies have demonstrated

that high intakes of vegetables are related to good cognitive function in elderly populations.^{30,31} It was suggested that high fruit and vegetable intakes (4 or more portions/day; >350 g/day) are associated with statistically significantly increased level of antioxidants, such as carotenoids and alpha-tocopherol, whose blood levels were correlated with the results of cognitive function tests, such as the MMSE, Clock Drawing Test, and Dem Test.³² From the nutritional side, sufficient intakes of fruits and vegetables supply valuable micronutrients, such as vitamins C and E and minerals, required for brain metabolism.³³ For instance, flavonoid intake dose-dependently reversed memory impairment by 40% to 70% in a mouse model.³⁴ Moreover, because lutein and zeaxanthin are widely distributed and function in brain tissue and the macula of the retina, adequate intakes are crucial for both visual and cognitive functions throughout the lifespan.³⁵

Milk was related to good school performance in this study. Dairy foods, including milk, were suggested to be beneficial to the neurocognitive functions of memory, vigilance, planning, and dichotic listening, probably due to better glucose tolerance in the brain and positive effects of bioactive peptides, colostrin, proline-rich polypeptides, lactalbumin, vitamin B12, calcium, and probiotics.³⁶

Our results showed positive relations between regular breakfast consumption and school performance in a dose-dependent manner. Several reports have suggested the beneficial effects of breakfast on cognitive performance and alertness.^{9,37,38} Regardless of supplement use, eating breakfast proved to be related to a smaller percentage of subjects not meeting two-thirds of the recommended daily allowance of valuable nutrients, including vitamin A (60.7% vs 43.0% for no breakfast vs breakfast, $P < 0.001$), vitamin C (35.6% vs 19.6% for no breakfast vs breakfast, $P < 0.001$), vitamin B-6 (35.6% vs 18.0% for no breakfast vs breakfast, $P < 0.001$), vitamin B-12 (20.7% vs 10.3% for no breakfast vs breakfast, $P < 0.001$), folate (23.7% vs 5.5% for no breakfast vs breakfast, $P < 0.001$), iron (34.8% vs 15.8% for no breakfast vs breakfast, $P < 0.001$), calcium (61.5% vs 38.8% for no breakfast vs breakfast, $P < 0.001$), phosphorus (36.3% vs 15.6% for no breakfast vs breakfast, $P < 0.001$), and magnesium (36.3% vs 21.4% for no breakfast vs breakfast, $P < 0.001$), which were difficult to compensate for through other meals in a European study.³⁹ These results can be partially explained by the fact that eating regular breakfasts at home reduces the consumption of unhealthy snack foods during the day.⁴⁰ In addition, eating breakfast may result in a more even distribution of energy and nutrient intake throughout the day. Therefore, it reduces obesity and energy shortages in the morning, which are negatively related to school performance in other studies of preschool children.⁴¹

In addition to these nutritional aspects, dietary habits themselves might influence school performance. Previous studies have demonstrated that overall diet quality, as indicated by the diet quality index, is independently related to academic performance, as subjects in 3rd (highest) diet quality index category were 30% less likely to fail a literacy assessment compared to 1st (lowest) diet quality index category (AOR = 0.70, 95% CI = 0.56–0.88).¹³ Dietary habits may reflect invisible factors, such as socioeconomic advantages and weight status, which can affect school performance.¹³ Health-related behaviors, such as eating breakfast, eating healthy foods, and avoiding junk foods, may be associated with good student compliance, which consequently improves school performance. It is possible that frequent fast food intake is

correlated with undetected living circumstances, for instance, living without guidance or being of low SES.⁴² On the contrary, frequent breakfast intake implies that the participants live in conditions that allow and with parents who provide breakfast. It may also indicate that they are well-disciplined and self-controlled persons. It has been suggested that self-control is linked with the performance of desired behaviors and the inhibition of undesired behaviors.⁴³ These circumstances may have significant effects on school performance by influencing school attendance, study duration, and personal characteristics such as steadiness and learning concentration. Moreover, it is possible that school performance affects dietary habits. For instance, students with good school performance might better knowledge of which dietary behaviors are good for health.

The present study, which adjusted for various factors including personal and socioeconomic factors using multinomial logistic regression analysis, is superior to previous studies. Furthermore, we adopted structural equation modeling to evaluate the relations among various personal, socioeconomic, diet factors, and school performance, thereby estimating the direct effects of diet factors on school performance (Figure 2). Diet factors influence school performance independently from the effects of other factors (direct effects) or depending on the influence of other factors (indirect effects). However, both diet factors and school performance are influenced by 3rd factors, such as personal and socioeconomic factors. For instance, socioeconomic factors are known to influence to school performance by mediating structural brain development.⁴⁴ Therefore, it was possible that socioeconomic factors influence to diet factors as well as school performance and that there is no direct association between school performance and diet factors. To consider these issues, we analyzed the direct and indirect effects of each factor. Each factor demonstrated significant total and direct effects on school performance (Table 5). Personal factors showed a total effect of 0.146 and a direct effect of 0.141 on school performance. Similarly, social economic status showed a total effect of 0.285 and a direct effect of 0.268 on school performance. In comparison, the direct effect of diet factors on school performance was 0.125, which is considerable compared to those of other factors.

This study has several limitations. Although we tried to consider numerous confounding factors, including some personal and socioeconomic covariates such as region of residence, economic level, and parental education level, we cannot completely exclude the influence of these factors, such as parents' occupations or family members living together. Moreover, as mentioned above, this study could not identify causal relations, such as possible reverse causality, due to its cross-sectional design.

As we mentioned in the method section, our classification system did not proportionally divide each level of school performance. However, this classification provided better information about the relations between the dietary habits and school performance than that obtained from a dichotomous classification. Another intrinsic limitation of this study is the accuracy of self-reported dietary consumption. As our survey investigated the frequencies of food intakes, the amounts of foods consumed could not be estimated. Moreover, because we retrieve the data only on the types of foods and there was no nutrient calculation, we were unable to quantify the nutrient exposure of the participants. However, our study population was representative of adolescents, and the survey was school based. Therefore, the reliability of the survey was predicted to be superior to those of the elderly or other general populations.

Furthermore, we excluded uncompleted surveys, which might imply low confidence in the survey answers.

This study possesses considerable value due to its novel findings. This is a unique study based on a large, representative population in Korea. This study considered various kinds of foods to analyze the factors associated with school performance. Numerous covariates and their interactions are considered using standardized regression analyses, which enable us to minimize the confounding effects of other factors on the relations between certain foods or meals and school performance. Even after considering personal factors and SES, dietary habits eating fruit, soft drinks, fast foods, instant noodles, confections, vegetables, and milk consumption as well as regular consumption of breakfast, lunch, and dinner showed significant influences on school performance. Each dietary habit was independently related to school performance. Further study will be needed to elucidate the mechanisms involved in the relations between these dietary components and academic performance.

CONCLUSION

The eating 3 times per day without skipping meals, especially breakfast, and frequent intakes of fresh fruits, vegetables, and milk were related to good school performance. However, consuming several processed foods such as soft drinks, instant noodles, fast foods, and eating confections more than 7 times a week showed correlations with poor school performance. This information about dietary habits has to be considered when we educate and consult on nutrition for adolescents.

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