Technical Support for School Lunch Quality Improvement
: Thailand Experiences

Abstract

National School Lunch Program (SLP) in Thailand was implemented, according to the Royal Mandate of School Lunch Fund Act 1991, for managing nutritious lunch and decreasing malnutrition. The program is covered all government primary school over the country.

Two national evaluations were done in 1995 and 2005. Not only insufficient budget was the problem, but also there was no standard regarding quality control, sanitation or quantity of food. Energy and also other important nutrients such as calcium, iron, and vitamin A were inadequate.

To improve school lunch quality, the Office of HRH Princess Maha Chakri Sirindhorn’s Projects has emphasized on integrated farm and school cooperatives training supports. Technical supports in nutrition aspect are necessary. Setting School Lunch Standard in simple format of Food Based Dietary Guidelines to met SLP nutrients goal. Developing friendly computer program for growth and nutritional status monitoring, and computer program for self-evaluated of the recipes quality. School self-evaluated scoring check lists of food security and personnel hygiene, food safety and nutrition activities, and also the regulation of snacks and drink marketing in school were developed. Handbook of recommended recipes, website of Cycle Menu Planning, and test kit for Iodized salt and undesired food additives are supported.
INTRODUCTION

School lunch program (SLP) in Thailand is a government-supported program. According to the Royal Mandate of School Lunch Fund Act 1991, the government must provide 500 million baht each year until total funding of 6,000 million baht (about 150 million US dollar) is reached. This fund is organized by national board of SLP. Earnings from the fund then will be used to run the program. In the early years, additional budget about 2000-2500 million baht was provided to be used as expendable fund. Primary school children in 6 Elementary School Administrative Offices are received 5 baht (about 12.5 cent)/ child/ day for 200 days/ year to support free lunch. This national nutrition program has run paralleled with School milk program (SMP) which is the national supplementary food in school for growth promotion. Both programs are covered all government primary school and Day care centre over the country. 1995, Institute of Nutrition, Mahidol University was requested to evaluate these two national nutrition program. The results from the evaluation demonstrated the impact of the programs on nutritional status improvement. The recently internal evaluation has done by Ministry of Education co-operated with Ministry of Health in 2007. The quality food is very little improvement.

Objective of the National School Lunch Program

- Manage enough food and nutritious lunch meal for every student and every day
- Malnutrition reduction
- Support free lunch for the poor student

Free Lunch Supporting Criteria

- Free lunch for all malnourished children
- For all students of Border Patrol Police General Headquarter schools which are schools in remote areas
- For all students of Royal-Public Welfare schools
- And for economically disadvantaged students


Total funding of 6,000 million baht was reached in 2000, but the earning from government’s bond buying is not enough to run the program. The subsidy from Thai government has still supported 3000 million baht each year.
Other National School Nutrition Program-School Milk Program (SMP)

- SMP in Thailand is also a government-supported program
- According to the objective of growth promotion, milk has been chosen to be the supplementary food for school children
- The program started to provide 200 ml. milk/child/day to all children of the first year-kindergartens in 1992
- In the evaluation year (1995), SMP is provided to all children from kindergarten up to Grade 1
- Expect to cover up to Grade 6, but progresses presently to Grade 4
- The expanding to cover up to Grade 6 has been approved in 2009

THE FIRST EVALUATION OF NATIONAL SCHOOL NUTRITION PROGRAM

During fiscal year 1991-1994, there were 3654.4 million baht provided. In 1995, Institute of Nutrition, Mahidol University was requested from Ministry of Finance to be outsider evaluator for the national school lunch and school milk program under the royal Thai government policy. The Objectives of evaluation were:
- Study the policy, planning, administration and organizational structure
- Study the service-management, efficiency and effectiveness of SLP
- Study quantity and quality of service-meal.
- Study impact on nutritional status
- Study the optimal budget for support of SLP

The 143 sampling schools of 6 Elementary School Administrative Offices in 18 sampling Provinces from 4 Regions and Bangkok were visited. Obtain record of food ingredients (5 recipes in each school) for evaluating the quantity and quality of meals. Collect weight and height data of pre & post established SLP Fund period / started SMP (1991 VS1995) to analyses nutritional status and growth rate. The 1,974 schools in 70 provinces responded mail-questionnaires.

Findings from Evaluations of School Lunch Program in Thailand

I. General
The funding helped to increase coverage regarding area and number of students supported. It also helped to improve quality of services. However, only about one third was received free lunch. Low price lunch was served for the others. Insufficient budget was the most common complained. Food production for SLP was emphasized only in Border Patrol Police General Headquarter schools. Inadequate personnel came to be serious problem.

II. Administration and operating system
The budget was spent as expendable fund for food expense only, not as starting capital. The program thus depended on yearly budget to sustain service and to expand.

III. Type of services
Whole meals were provided or only partly were provided as supplements. No personnel nutritionist in school. Assigned teachers took turn to organize SLP. Very few schools used or had standard menu or concerned about nutrition content of the meal. Menu planning was ignored and day by day menu was commonly practice in most school, especially in rural area.
**IV. Quality**

There was no standard regarding quality control, sanitation or quantity of food. The meals could provide 70% of target energy requirement. Components such as calcium, vitamin A, B₁ and B₂ were also inadequate.

**RESULTS OF NUTRITIONAL EVALUATION**

**Quantity & Quality of School Feeding**

**Target Quality of School Lunch Meal**
- National Standard Nutrients Intake and Standard Food Ingredients of SLP for Thai primary school student were not established officially
- One-third of average nutritional quantity from Thai RDA for children (boy and girl) age 4-12 yr and caloric distribution from Carbohydrate: Protein: Fat equally to 55-65: 10-15: 25-30 were used as target for this evaluation

**Quantity & Quality of School Feeding**
- Quantity and quality of food was computed from 595 recipes of 125 schools
- Mean energy value per meal amounted to 70% the recommended target namely, 1/3 of Thai RDA (1989)
- Macronutrient levels of SLP meals provided 3/4 of the targets while caloric distribution of C: P: F ratio was 64.2: 11.5: 24.3
- For micronutrients of SLP meal, only iron and vitamin C furnished over 80% of the Thais’ RDA
- Levels of Calcium, vitamin A, B₁, B₂ were relatively less adequate
- When SLP meal added up with 200 ml. milk supplement of SMP, the school nutritional feeding programs provided all nutrient levels above 70% of the target

**Energy and Macronutrients from SLP meal and SLP meal plus SMP milk supplement**

![Energy and Macronutrients bar chart](image-url)
Micronutrients from SLP meal and SLP meal plus SMP milk supplement

**Mean Adequacy Ratio**
- MAR (average NAR of energy, protein, Ca, Fe, Vitamin A, B1, B2 and C)
- Mean Adequacy Ratio of SLP meal is only 59
- 200 ml of milk supplementation could help to improve nutrients quality. MAR is increased to 92

**Problem of Lunch Meal**
- Main problem of SLP quality:
  - Inadequate energy which is due to inadequate amount
  - Low INQ (Index of Nutritional Quality) of Ca, vitamin A, B1 and B2
- Half of rural school meals could not meet 4 food groups, while more than 80% of urban school meals could do so (although completing food groups do not ensure the quality of food, 4 food group meals from this study shows 11% more of the energy target than 3 food group meals)
- Fruits are rarely served for school lunch

**Quality Development Constraints**
- Lack of Strategic for Quality Control & Development.
- Lack of Recommended Standards for Foods in SLP
- Lack of Quality Monitoring System
- Lack of Personnel Training

**Impact on Nutritional Status**
- A sharp decline in the prevalence of malnutrition was noted during 1993 to 1994 which was the same period of sharp increase in SLP budget
- The prevalence remained relatively steady after that, and slightly increased after economic crisis in 1997
Prevalence of underweight students from surveillance reports VS SLP budgets

- Schools under Border Patrol Police General Headquarter are remote area schools which usually have rate of malnourished children higher than other elementary schools. So, free lunch support for all students. Sharp decline in malnutrition from 26.2% to 13.9% at the first year of SLP big budget (1994) has been observed.
- In most schools, underweight prevalence decreased at the end of the academic year as compared to the beginning of the same academic year.
- Kindergartens who received both SLP & SMP had decline in prevalence of underweight during program period more than pre-program period. Stunted rate remained unchanged instead of showing increase. They also had better rate of weight gain during the evaluating year than before the program period. Their average height gain during pre & post program showed clear impact of the program.
- Grades 3 - 4 students who had only school lunch showed some trend of increasing rate of height gain, while Kindergartens who had both school lunch and milk supplement showed clear improvement of height increment.

Average height increment of pre & post School Feeding Program
Recommendations from the Evaluation

- Participation by the local organization and the community should be urged, such as fund raising, labour donation, perceptions of the situations and decision making
- Promotion of school food production for supporting raw material of SLP
- The milk supplement program should be incorporated with the school lunch program for every student
- Sanitation and food safety should be concerned
- Quality improvement, including personnel skill development and program monitoring system should be established
- Set clear and possible short and long term goal, so that the program can be sustainable with self-reliance
- Research regarding methods and related techniques are needed

TECHNICAL SUPPORT FOR SCHOOL LUNCH QUALITY IMPROVEMENT

Increasing 20 percent of the budget meal per head per day from 5 baht (about $ 0.14) to be 6 baht (about $ 0.17) in further years was the respond from Government. The budget was up to 10 baht (about $ 0.28) in 2004 and had just increased to be 13 baht (about $ 0.37) in 2008. However, the increasing financial supports alone unable to improve the quality of food. The recently internal evaluation has done by Ministry of Education co-operated with Ministry of Health in 2007. Although the program coverage is not a main problem now, but the quality of meal’s nutritive values is improved not so much. The energy is closer to the minimum target (at least 90% of total energy recommendation) from protein and fat increasing.

Comparison of Average Served Macro-nutrients for School Lunch Meal between the National Evaluation in 1997 and 2007
Water soluble vitamins, such as; vitamin B1, B2 and C which were not a main problem increase more, while vitamin A, a very important fat soluble vitamin for immunity and Calcium which is important mineral for growth are still below their target levels. The decreasing of Iron is observed in most area. So technique supports are necessary for improving school meal nutrient quality.
Technique support in School Food Production

The self-food production in school is one of the important strategic to improve the school health and nutrition program, especially in rural and/or the remote area schools. The office of HRH Princess Maha Chakri Sirindhorn’s Projects has regularly organized technique training for school personnel. Seed and simple agriculture tools for school gardening were supported to all schools under the Border Patrol Police (BPP) Headquarters Office. Over 20 years experiences of the office of HRH Princess Maha Chakri Sirindhorn’s Projects create know how of integrated farm and system of school cooperatives to supply and sustain school lunch program in rural poor areas. School agriculture and system of school cooperatives were integrated in student learning experience. Many schools could depend on their own product nearly whole school days, while some of them have extra product, such as; eggs, mushroom etc. which were sold in their community though school co-op . The result of evaluation in 2007 shows the higher school meal quality in BPP schools than most of other primary schools.

Comparison of Average Served Micro-nutrients for School Lunch Meal of the National Evaluation in 2007 between Primary Education Schools and BPH Schools

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>MOPH07</th>
<th>BPH MOPH07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>20.6</td>
<td>36.5</td>
</tr>
<tr>
<td>Iron</td>
<td>82.3</td>
<td>140.3</td>
</tr>
<tr>
<td>Vit.A</td>
<td>48.1</td>
<td>55.7</td>
</tr>
<tr>
<td>Vit.B1</td>
<td>257.3</td>
<td>271.3</td>
</tr>
<tr>
<td>Vit.B2</td>
<td>107.6</td>
<td>241.0</td>
</tr>
<tr>
<td>Vit.C</td>
<td></td>
<td>382.1</td>
</tr>
</tbody>
</table>

Technique support in Nutrients Quality

Thailand does not have specific personnel such as; dietician or nutritionist to manage school meals. Teachers have to do it in the meantime, but the school meal quality goals in nutritive values format are too difficult to use for non-nutrition background persons. So, most of school lunch menus and food quality were based on cooking skill of each person. Minimizing use of limited supply neither the budget nor food product is also importance for successfullness of school meal improvement.
The information of food quality and pattern should evaluate for developing School Lunch Standard Recommendation in Food Based Dietary Guideline format. Recommended recipes and menus planning are developed according to that standard. The best way to improve the school meals is supporting teachers to know their meals quality and develop their own recipes by themselves.

### Standard School Lunch Thailand 2006

**Food portions per meal per person & Frequency per week**

<table>
<thead>
<tr>
<th>Food item</th>
<th>3-5 Yr</th>
<th>6-12 Yr</th>
<th>13-18 Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Portion/meal</td>
<td>Time/wk</td>
<td>Portion/meal</td>
</tr>
<tr>
<td>Streamed rice (raw in g)</td>
<td>1.5 Bsp</td>
<td>5</td>
<td>2 Bsp</td>
</tr>
<tr>
<td>Vegetables*</td>
<td>0.5 Bsp</td>
<td>3-5</td>
<td>1 Bsp</td>
</tr>
<tr>
<td>Fruits*</td>
<td>0.5 Portion</td>
<td>3-5</td>
<td>1 Portion</td>
</tr>
<tr>
<td>Fishes</td>
<td>2 Tbs</td>
<td>1</td>
<td>2 Tbs</td>
</tr>
<tr>
<td>Meats</td>
<td>2 Tbs</td>
<td>1</td>
<td>2 Tbs</td>
</tr>
<tr>
<td>Egg</td>
<td>1 egg</td>
<td>2</td>
<td>1 egg</td>
</tr>
<tr>
<td>Liver**</td>
<td>0.25 Tbs</td>
<td>0-1</td>
<td>0.25 Tbs</td>
</tr>
<tr>
<td>Tofu**</td>
<td>2 Tbs</td>
<td>0-1</td>
<td>2 Tbs</td>
</tr>
<tr>
<td>Edible bone small fishes**</td>
<td>2 Tbs</td>
<td>0-1</td>
<td>2 Tbs</td>
</tr>
<tr>
<td>Cooked Blood***</td>
<td>2 Tbs</td>
<td>0-2</td>
<td>2 Tbs</td>
</tr>
<tr>
<td>Cooking fat-oil</td>
<td>1 Tsp</td>
<td>5</td>
<td>1.5 Tsp</td>
</tr>
<tr>
<td>Flour for snack</td>
<td>2 Bsp</td>
<td>2</td>
<td>2 Bsp</td>
</tr>
<tr>
<td>Legumes</td>
<td>6 Tbs</td>
<td>1</td>
<td>6 Tbs</td>
</tr>
<tr>
<td>Starchy roots</td>
<td>2 Bsp</td>
<td>1</td>
<td>2 Bsp</td>
</tr>
<tr>
<td>Sugar</td>
<td>0.5 Tsp</td>
<td>5</td>
<td>0.5 Tsp</td>
</tr>
<tr>
<td>Drinking water</td>
<td>1 cup</td>
<td>5</td>
<td>1 cup</td>
</tr>
<tr>
<td>Non sweeten Milk</td>
<td>200 ml</td>
<td>5</td>
<td>200 ml</td>
</tr>
<tr>
<td>Soya milk****</td>
<td>200 ml</td>
<td>(2)</td>
<td>200 ml</td>
</tr>
</tbody>
</table>
Supporting in necessary nutrition information and simplify tools were developed

- Setting SLP nutrient requirements by nutritionist forum of Obesity Prevention Working Group, organized by Public Health Foundation
- Developing the Thai Food Based Dietary School Lunch Standard (food portion size and number of serving format) by Institute of Nutrition, Mahidol University
- Supporting for recommended recipes (Handbook for SLP recipes) by Ministry of Education
- Developing friendly computer program for self-cycle menu planning by Institute of Nutrition, Mahidol University
- Developing friendly web program of School Lunch Menus and Recipes Management for supporting school meal raw materials calculation by Institute of Nutrition, Mahidol University, funding by Thai Research Fund
- Developing friendly computer program for self-evaluating the quality of recipes and self-developing/improving local recipes at local/school level by Institute of Nutrition, Mahidol University
- Supporting test kit for testing Iodized salt (I-kit), developed by Faculty of Science, Mahidol University

Technique support in Self-monitoring/evaluation

- Supporting food safety test kit for testing undesired food additives by Ministry of Public Health
- Developing regulation/guidelines of marketing food to children in school by nutritionist forum of Obesity Prevention Working Group, organized by Public Health Foundation
- Developing friendly computer program for self-evaluating the nutritional status at school level by Institute of Nutrition, Mahidol University
- Developing self-evaluated scores/check lists of food security and personnel hygiene, food safety and nutrition activities for school Food Safety and Nutrition Guideline for Food and Nutrition Program in School by Institute of Nutrition, Mahidol University

Training support

Although series of supporting in necessary nutrition information and simplify tools were developed. However, it is necessary to support some level of training. The National School Lunch Fund Office included training support for the menu planning and growth monitoring in the Development Plan of School Lunch Program in 2009-2011.
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Research Experiences for Health and Nutrition in School:

1992-1993 The Height for Age Interpretation with Stunt Detector and Interpretation Card by Health Personnel.
1995-1996 Evaluation of National School Lunch and School Milk Program of Thailand
2003 Handbook for Growth Monitoring and Nutritional Surveillance in School
2003 Survey of Sweet and Snack Consumption among Thai School Children.
2004-2007 Use of BMI for Age for Obesity Indicator in Thai Children.
2006 The Development of Thai Food Based Dietary School Lunch Standard.
2006-2007 Computer Programs for School Lunch Menus and Recipes Management