

## Asia

# Thailand conquered under-nutrition very successfully but has not slowed obesity

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## Summary

Under-nutrition in Thailand has been successfully controlled for over two decades. However, Thailand is now facing a double-burden malnutrition problem where under- and over-nutrition coexist. Overweight, obesity, and related diseases are the main nutritional challenges, leading to high costs for curative care. Thailand foresees that nutrition can be an effective strategy for preventing diet-related non-communicable chronic diseases, and the country aims to reduce costs for secondary and tertiary health care. Various organizations have conducted national programmes, focusing especially on nutrition education and public campaigns, which have been sustainable and not sustainable. Only milk and certain foods for children are mandated for nutrition labeling. Guideline daily amounts is now the nutrient profile mandated for snack foods in Thailand. To increase efficiency, Thailand's National Food Committee has been established to link food, nutrition and health via a multi-sectoral approach.

**Keywords:** National campaign, NCD, Thailand.

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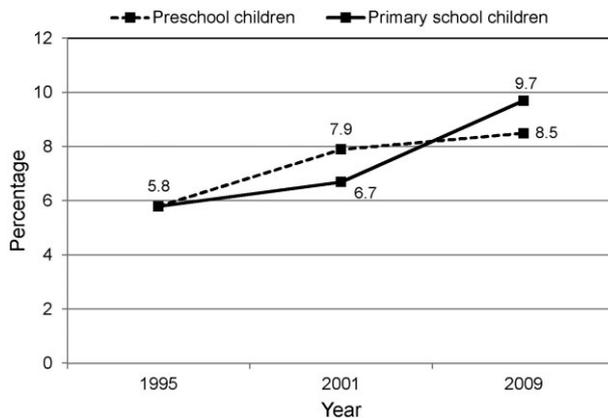
## Introduction

Four decades ago, Thailand was still among the developing countries whose populations were suffering from under-nutrition and related diseases. At that time, the Poverty Alleviation Plan aimed at achieving basic minimum needs (BMNs), including a reduction in child malnutrition. Community-integrated programmes composed of multi-sectoral basic services, mass mobilization of volunteers and nutrition indicators were implemented to reach all populations. The ongoing school milk and school lunch programmes are examples of the activities that were originated for solving under-nutrition. Consequently, the prevalence of underweight in preschool children declined from 51% in 1980 to 20% in 1990 and then to below 10% in 2006. Similar to many other Asian countries, Thailand has experienced rapid and continuous economic growth, which provides basic social services and improved living conditions to its general population. Thailand is now classified as

a middle-income developing country. However, emerging nutrition challenges, including overweight and obesity and related chronic diseases, have become a burden for the nation. The increasing rate of overweight and obesity among the Thai population is quite alarming, as are the rising curative costs of non-communicable chronic diseases (NCDs). To address these challenges, the Thai government and stakeholders are implementing preventive rather than curative measures. National strategies have experienced both successes and failures. Several new projects are being planned for future implementation.

## Overweight and obesity: current situation

Body mass index (BMI) and waist circumference (WC) are used as the indicators for overweight and obesity in the Thai population. The international cutoff values for both indicators, however, were slightly adjusted so they fit better with the Thai physical status. The BMI cutoff values are



**Figure 1** Prevalence of overweight and obesity among school children (ages 6–14 years).

22.9 and 25.0 kg m<sup>-2</sup> for overweight and obesity, respectively. The WC cutoff values formerly were 90 and 80 cm for males and females, respectively, but they have been changed (2013) to half of an individual's height. Ministry of Public Health surveys performed in 1995–2009 indicated that the number of Thai school children who were overweight and obese (based on weight by height) was increasing continuously (Fig. 1). The most up-to-date data in 2009 shows that the percentages of males and females with excessive WCs were 18.6% and 45.0%, respectively (1).

Another indicator related to NCDs is the amount of fruits and vegetables consumed by a population. Even though the country abounds with various types of fruits and vegetables, Thai males consume on average only 268 g per day and Thai females 283 g per day (Health Examination Survey 2003–2004) (2), which is much lower than the 400 g per day recommended by the Food and Agriculture Organization of the United Nations (3) and the World Health Organization, International Association for the Study of Obesity, and International Obesity Task Force (4).

NCDs became a significant public health problem for Thailand during the last decade. In 2011, cardiovascular diseases and stroke were the leading causes of death among the Thai population (Table 1). Medical expenses for NCDs were estimated at 140 billion baht (US\$4.7 billion) in 2009, and those for overweight and obesity were estimated at 12 billion baht (US\$400 million).

### National programmes for controlling overweight and obesity

Initially, Thailand saw overweight and obesity and related diseases as challenges that could be prevented via nutrition education. Food-based dietary guidelines for individuals older than six years were developed along with a food

guide model presented as a hanging flag. In addition, nutrition information was provided through nutrition labeling that used a nutrition fact table for processed foods. Later the guideline for daily amounts (GDA) was added to the label. National campaigns encouraging increased fruit and vegetable consumption, regular exercise, and monitoring and control of WCs were implemented inconsistently (i.e. only during certain periods of certain governments). In 2010, the National Food Committee, chaired by the prime minister, developed the Strategic Framework for Food Management in Thailand (SFFM), which was approved by the cabinet in November 2010. The SFFM is currently implemented through three committees: Food Security throughout the Food Chain; Food Quality and Safety; and Linking Food, Nutrition, and Health. The third committee addresses NCDs as a priority issue and has several subcommittees working on the following specific issues.

### Previous and ongoing nutrition programmes

#### Food-based dietary guidelines and the nutrition flag

Established in 1996, Thailand's food-based dietary guidelines recommend maintaining proper weight and eating a variety of foods from each of the main food groups; eating an adequate amount of rice or alternative carbohydrates; eating plenty of vegetables and fruits regularly; eating fish, lean meat, eggs, and legumes and pulses regularly; drinking milk of appropriate quality and quantity for one's age; consuming an appropriate amount of fat; avoiding sweet and salty foods; eating clean and safe food; and avoiding or reducing consumption of alcoholic beverages (Table 2) (5). The nutrition flag or food guide provides information on the proper portions of cereals and other complex carbohydrates, fruits, vegetables, animal foods, legumes and pulses, sugar, salt, and fat one should consume daily (Fig. 2) (6). The original nutrition education and communication guides were difficult for people to understand. Consequently, the suggested portions were modified to reflect familiar serving utensils (Fig. 3) (6) and are now more useful for dietitians and food counselors.

#### 'Half fruits and vegetables and half of others' campaign

In 2005, the Ministry of Public Health launched a campaign to promote diets that are half fruits and vegetables and half other foods, in line with the government policy. The concept was quite easy to understand and practical and thus was widely adopted (Fig. 4) (7). Unfortunately, this campaign was discontinued in 2006 due to a lack of funding.

NCD	Death rate per 100,000 population	Prevalence rate per 100,000 population
Cardiovascular diseases	31.4	935.92
Stroke	30.0	277.75
Diabetes mellitus	11.9	848.77
Hypertension	5.7	1,187.00

**Table 1** NCD prevalence and death rates in 2011

Source: Bureau of Policy and Strategy, Ministry of Public Health 2013.  
NCD, non-communicable chronic disease.

#### Food-based dietary guidelines

- Eat a variety of foods from each of the five food groups and maintain proper weight.
- Eat an adequate amount of rice or alternative carbohydrates.
- Eat plenty of vegetables and fruits regularly.
- Eat fish, lean meat, eggs, and legumes and pulses regularly.
- Drink milk of appropriate quality and quantity for one's age.
- Eat a diet containing appropriate amounts of fat.
- Avoid sweet and salty foods.
- Eat clean and safe food.
- Avoid or reduce the consumption of alcoholic beverages.

**Table 2** Thailand's food-based dietary guidelines

#### Nutrition fact table

In 1998, the Ministry of Public Health implemented nutrition labeling on a voluntary basis except for milk and milk products and food products that make nutrient claims. The nutrition labels clearly aim to prevent both under- and over-nutrition and related NCDs. The format of Thailand's nutrition fact table is similar to that of the US Food and Drug Administration, but it is complicated and therefore difficult for general consumers to understand (Table 3) (8). Since labeling is voluntary for most food products, the nutrition fact table is used to enhance the image of a food product rather than to provide nutrition knowledge to consumers. The nutrition fact table in Thailand thus makes a food product look good but has little impact on knowledge about its nutrition and appropriate consumption.

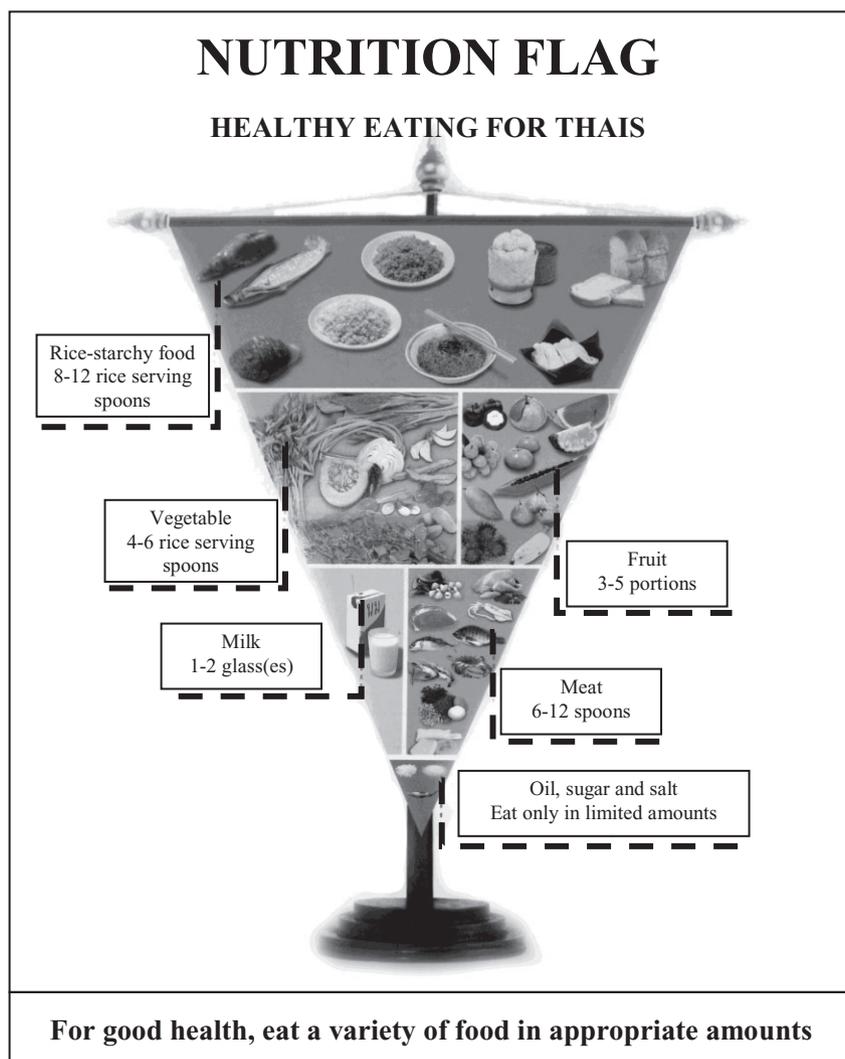
#### Guideline for daily amounts

During the last two decades academicians and consumer protection agencies made requests to the Ministry of Public Health to create a nutrition profile for all food products that included a traffic light designation for at least three nutrients (i.e. saturated fatty acids, sugar and sodium). This issue was hotly debated by health policy lobbyists, academicians, nongovernmental organizations (NGOs), especially consumer protection agencies, and the food industry. One side claimed that consumers have the right to know-

edge that will help them choose the right nutrients for their health. Another side blamed the traffic light symbol for causing more confusion and misleading consumers. As the middleman, Thailand's Food and Drug Administration (FDA) decided to implement the guideline for daily amounts (GDA) for these three nutrients on a voluntary basis except for snacks. The Thai GDA is slightly different from others, since the interpretation is based on one package, not one serving, regardless of package size. This application may be realistic only for snack products, since consumers almost always eat the entire package of a snack at one time (Fig. 5) (9). Its implementation for other food products is still doubtful. Furthermore, the GDA concept is not acceptable to either the food industry or academicians. Academic and health policy people in Thailand in fact prefer the traffic light model.

#### Campaign for regular exercise and physical activity

Since 2009, the Ministry of Public Health has conducted various national campaigns that promote regular exercise or physical activity. Several public and private organizations have also adopted this concept. Public areas for exercise have been arranged in many workplaces and communities. Most local authorities have allocated budgets to facilitate these activities, especially for the elderly. This campaign seems to be quite successful, especially at the community level (Fig. 6) (10).



**Figure 2** Thailand's nutrition flag.

### 'Thai People Have Flat Belly' campaign

The campaign 'Thai People Have Flat Belly' aimed at promoting healthy behaviour on food consumption and physical activities for Thai people to reduce non-communicable diseases by using their WC's as indicators for self monitoring. This campaign could have garnered high public interest, as it involved high-ranking politicians (Fig. 7) (11), and the public has learned the cutoff values for healthy WCs (12). Similar campaign with more in depth investigation was led by the Royal College of Physicians of Thailand under the title 'Network of Fatless Belly Thais' with the same objectives but also aiming for reducing intra-abdominal adiposity and metabolic syndrome for Thai people (13). Under this campaign concept, the Thai Health Promotion Foundation also funded a television series of the mentioned network with the collaboration of the Thai Public Broadcasting Service (Thai PBS): The firm, Fat Fact (Fig. 8) (13).

### Sweet Enough Network

The Sweet Enough Network was established by a group of dentists, pediatricians and public health workers in the Ministry of Public Health's Dental Health Division to endorse regulations to reduce added sugar in food products. Its intervention ranges from national to local authorities.

The campaign endorsed banning sugary beverages from schools, including sweetened carbonated beverages, and added sugar from follow-up infant formulas (14). A national law prohibiting added sugar in follow-up infant formulas was one of the successes of this network.

### 'Foods for Children' control

The Thai FDA and the Public Relation Department issued the regulation on commercialization of 'Foods for Children', which limits the advertisement periods of foods for children from television prime times for children and family

 1 plate of rice = 3 rice-serving spoons	 1 bowl of noodle = 2 rice-serving spoons	 1 slice of bread = 1 rice-serving spoons	 1 piece of fermented noodle = 1 rice-serving spoons	 1 ear of corn = 1 rice-serving spoons
 kale = 1 rice-serving spoons	 pumpkin = 1 rice-serving spoons	 2 tomatoes = 1 rice-serving spoons	 Ivy gourd = 1 rice-serving spoons	
 1 banana = 1 portion	 1 orange = 1 portion	 6 pieces of papaya = 1 portion		
 1 chicken drumstick = 2 spoons	 1 egg = 2 spoons	 1 mackerel = 2 spoons	 1 tofu = 4 spoons	
 milk = 1 glass	 yogurt = 1 cup			

**Figure 3** Use of household units for Thailand's food-based dietary guidelines.



**Figure 4** The 'Half Fruits and Vegetables and Half Others' campaign.

(12 min per hour). Moreover, a toy is not allowed to be sold along with foods for children, and warning sign as 'Eat Less, Exercise More' is required on the label of the product classified as unhealthy. As being surveyed by a consumer protection agency in 2010, these regulations are still violated widely (15). The control of radio and television advertisements which just have been transferred to the Office of

the National Broadcasting and Telecommunications Commission (NBCT), is still not clearly active on the policy of food marketing for children.

### Current programmes: planned and pilot implemented

#### Projects on overweight, obesity and related diseases under the National Food Committee

Since the Thai cabinet established the National Food Committee in 2010, several subcommittees, task forces and working groups within the committee on Linking Food, Nutrition, and Health have actively pursued the following projects.

- Standards and indicators for nutrition and NCDs

The committee has revised existing anthropometric, physical, and biochemical standards and indicators used for evaluating nutritional status and NCDs in the Thai population.

- Food-based dietary guidelines for different age groups  
Food-based dietary guidelines for specific age groups other than the general population have been developed.

**Table 3** Thailand's nutrition labeling

Nutrition information			
Serving size: 1/2 bag 25 g			
Serving (s) per bag: 2			
<b>Amount per serving</b>			
<b>Total energy</b> 130 kcal (Energy from fat 60 kcal)			
<b>Total fat</b>	7 g	<b>Percent Thai RDI*</b>	<b>11%</b>
Saturated fat	3.5 g		<b>18%</b>
<b>Cholesterol</b>	0 mg		%
<b>Protein</b>	6 g		
<b>Total carbohydrate</b>	10 g		<b>3%</b>
Dietary fiber	2 g		<b>8%</b>
Sugars	<1 g		
<b>Sodium</b>	100 mg		<b>4%</b>
<b>Percent Thai RDI*</b>			
Vitamin A	<b>0%</b>	Vitamin B <sub>1</sub>	<b>4%</b>
Vitamin B <sub>2</sub>	<b>4%</b>	Calcium	<b>0%</b>
Iron	<b>4%</b>		
*Percent Thai Recommended Daily Intake for Thai population over 6 years of age, are based on 2,000 kcal diet.			
Energy requirement vary by individuals. If your activities require energy of 2,000 kcal per day, your daily should provide the following nutrients:			
Total fat	Less than	65	g
Saturated fat	Less than	20	g
Cholesterol	Less than	300	mg
Total carbohydrate		300	g
Dietary fiber		25	g
Sodium	Less than	2,400	mg
Calories per gram: fat 9; protein 4; carbohydrate 4			

The boldface is normally for the main nutrients.

- Food, nutrition, and dietetic education for different age groups

Appropriate educational tools have been developed at the community level for transferring food and nutrition knowledge to promote healthy nutrition and good health and to prevent diet-related NCDs.

- Increase fruit and vegetable consumption

The committee has accumulated available knowledge on the health benefits of fruits and vegetables, especially local varieties, and developed consumption-promotion strategies.

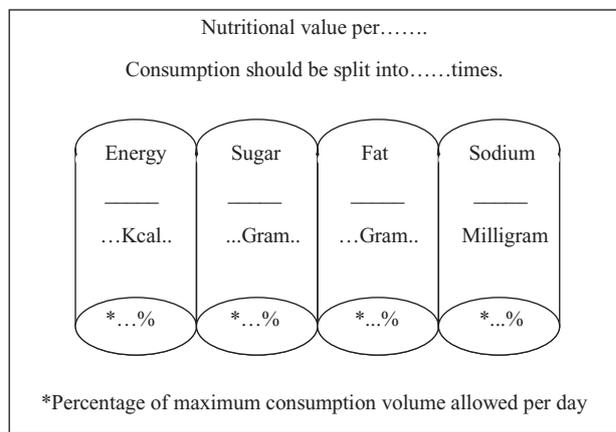
- Reduction of sugar, sodium, and fat in diets

Identification of contributing sources of sugar, sodium and fat in the Thai population has facilitated the development of appropriate strategies, such as consumer campaigns, food product development in the industry and school education, to manage the most common sources.

- School-based food and nutrition

Evaluation of the ideal model for food and nutrition management in schools, mostly in the countryside and in 27 schools in Bangkok under the patronage of Her Royal Highness Princess Maha Chakri Sirindhorn, has demonstrated key success factors that are economical and can be used for expansion into other schools.

- Community-based food and nutrition programme to promote healthy nutrition and healthy people while controlling and preventing obesity and related NCDs



**Figure 5** Format of the Thai FDA's GDA labeling.

The Ministry of Public Health has adopted a successful community-based programme for the alleviation of maternal and child under-nutrition to help solve the emerging NCDs problem. The ministry plans to actively involve existing volunteers (1 per 10 households) in every part of the country. They will work jointly with the subdistrict hospital to promote health and nutrition and provide services to all community people using a life course approach that extends from antenatal care to care for the elderly. It is



**Figure 6** Exercise is offered in workplaces and communities under the national campaign.

aimed at promoting good nutrition and good health and reducing the need for secondary and tertiary health care.

- Annual national survey for nutrition status and NCDs  
An attempt is being made to conduct an annual national nutrition survey instead of the 5- to 10-year round. This strategy would allow the country to identify nutrition problems more promptly and solve them in a more timely manner. The survey topic, sample population, and information collection will be centrally designed and carried out by local public health and nursing schools around the country.

- Food and nutrition management during crisis  
The massive flood in 2011–2012 made it clear that Thailand must become better prepared for food and nutrition security during crises. Food supports during and after a crisis are being planned in a sustainable way and through nutrition awareness.

### Resolution on overweight and obesity of the National Health Assembly

Overweight and obesity have emerged as potential public health problems in Thailand during the past decade, espe-

cially among children. The National Health Assembly, a participatory-policy process to promote healthy public policy on major health problems in Thailand, brought the issue of overweight and obesity to the second National Health Assembly, and passed a resolution intended to adopt a national strategies and to develop an action plan for management of overweight and obesity in 2009 (16–18). In mid-2010, the working group drew up a framework for developing an action plan with six key areas: (i) promote breast-feeding and healthy diets, (ii) control the marketing of food for children, (iii) raise public awareness about the risks of obesity and overweight through public communication, (iv) promote physical activities, (v) strengthen health services and programmes to mitigate problems associated with overweight and obesity, and (vi) strengthen an overall system to address and monitor obesity and overweight and a system to evaluate related programme. The national action plan to fight overweight and obesity was drafted and sent back to the National Health Assembly in 2011 with updated situations of the resolution in 2009 on implementing traffic light labeling of processed food, applying tax and price policies to unhealthy foods, and

controlling the marketing of energy-dense and unhealthy foods that target children. Even though the National Health Assembly has introduced these impressive recommendations for a national plan to fight overweight and obesity, implementation has been slow, since several agencies other than health agencies have had to be involved. Consequently,

a measure to raise awareness and commitment among non-health agencies has become an issue.

**‘OK’ symbol for ok products: potential Thailand’s Future Programme**

On 11 February 2013, Professor Barry Popkin presented ‘Regulatory Options Being Utilized to Address Rising Nutrition-Related Noncommunicable Diseases’ at the Institute of Nutrition, Mahidol University, Thailand. Most stakeholders, including academicians, food industry representatives, the Thai FDA and health policymakers were receptive to this presentation and would like to test the ‘OK’ concept. They felt that the concept was clear and would not cause confusion among the consumers. In addition, it was a positive approach and did not classify any type of food as poison. The Thai FDA will establish the ‘OK’ criteria based on the contents of three nutrients (i.e. saturated fatty acids, sodium and sugar) in each commercial food product. The ‘OK’ symbol will be issued to qualifying food products with quality monitoring by an independent organization. It is expected that the ‘OK’ symbol will be a tool to help consumers choose the right food products for their health and to encourage food industries to take a healthy direction in developing food products. However, it may take some time to set up criteria and achieve agreements among stakeholders. This ‘OK’ system Popkin presented was based on the Mexican government’s experience in adapting an international system whose criteria were set by an independent group of nutrition scientists and which has been adapted to a number of countries globally. A paper discussing this system was published earlier (19).

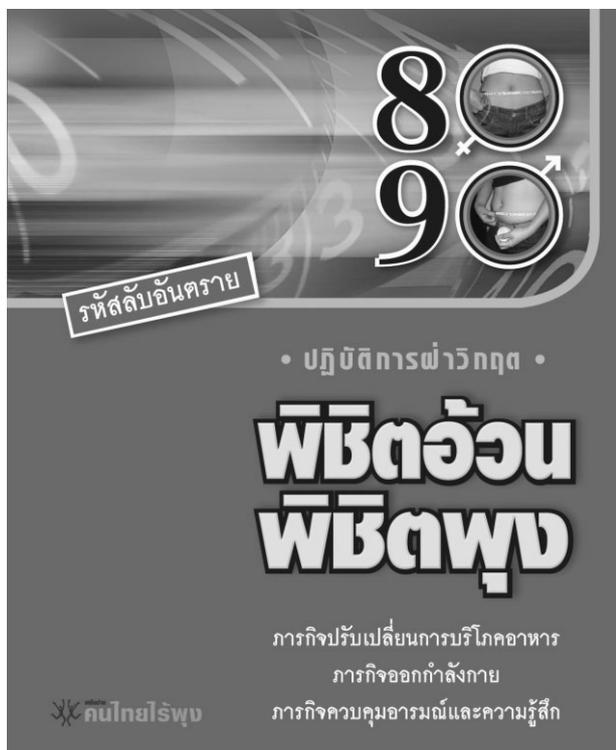


Figure 7 The ‘Thai People Have Flat Belly’ campaign.



Figure 8 Television series of the Thai Health Promotion Foundation and the Thai Public Broadcasting Service to campaign against overweight and abdominal obesity.

## Conclusion

Thailand is aware of its emerging overweight, obesity and NCD challenges. Several control and prevention approaches were implemented in the past, some successful and some not so successful. The current strategies under the National Food Committee are comprehensive. They focus on the links among agriculture, food, nutrition and health with the ultimate goal of food and nutrition security and prosperity for the country. More research and capacity development on various issues are still required to support implementation. Moreover, it is essential to monitor and evaluate programmes in terms of outputs, outcomes, impacts, cost-effectiveness and efficiency for further improvement. Nutrition indicators have been very helpful and effective in evaluating any programme and strategy. Sharing experiences with and learning from other countries are also important to strengthen programmes and strategies to ensure healthy nutrition and healthy people.

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## Conflicts of interest

The authors have no conflicts of interest to declare.

## References

1. Aekplakorn V, Satheannoppakao W, Kasemsap R, Pakcharoen H. National Health Examination Survey IV 2008–2009: Health

Report Thailand, Health System Research Institute and Bureau of Policy and Strategy. In: Health MoP (ed.): Bangkok, Thailand, 2011.

2. Aekplakorn V, Satheannoppakao W, Kasemsap R, Pakcharoen H. National Health Examination Survey IV 2008–2009: Children Health Report Thailand, Health System Research Institute and Bureau of Policy and Strategy. In: Health MoP (ed.): Bangkok, Thailand, 2011.

3. Food and Agriculture Organization, World Health Organization. Fruit and vegetables for health. Kobe, Japan, 2004. [WWW document]. URL [http://www.who.int/dietphysicalactivity/publications/fruit\\_vegetables\\_report.pdf](http://www.who.int/dietphysicalactivity/publications/fruit_vegetables_report.pdf) (accessed 15 April 2013).

4. World Health Organization, International Association for the Study of Obesity, Force IOT. *The Asia-Pacific Perspective: Redefining Obesity and its Treatment*. In: Communications H (ed.). Health Communications Australia Pty Limited: Melbourne, Australia, 2000.

5. Food and Agricultural Organization. Food-based Dietary Guideline: Thailand. 2010. [WWW document]. URL <http://www.fao.org/ag/humannutrition/nutritioneducation/fbdg/49850/en/tha/> (accessed 15 April 2013).

6. Nutrition Division, Department of Health, Ministry of Public Health. Manual nutrition flag healthy eating for Thais. Bangkok, Thailand, 2001. [WWW document]. URL [http://nutrition.anamai.moph.go.th/temp/main/upbook/file\\_large/NutritionFLAG.pdf](http://nutrition.anamai.moph.go.th/temp/main/upbook/file_large/NutritionFLAG.pdf) (accessed 21 April 2013).

7. National Cancer Institute. The half fruits and vegetables and half others. In: Department of Medical Services MoPH (ed.): Bangkok, Thailand, 2012.

8. Judprasong K, Puwastien P, Boonpor J, Pinprapai N. Laboratory performance on analysis of mandatory nutrients and preparation of nutrition labelling. *Food Chem* 2013; **140**: 598–607.

9. US Department of Agriculture. Thai FDA's New Guideline Daily Amounts (GDA) Labeling. Bangkok, Thailand, 2011. [WWW document]. URL [http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Thai%20FDA%E2%80%99s%20New%20Guideline%20Daily%20Amounts%20%28GDA%29%20Labeling%20\\_Bangkok\\_Thailand\\_6-13-2011.pdf](http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Thai%20FDA%E2%80%99s%20New%20Guideline%20Daily%20Amounts%20%28GDA%29%20Labeling%20_Bangkok_Thailand_6-13-2011.pdf) (accessed 21 April 2013).

10. Physical Activity and Health Division. Brochure of Physical Activity and Health Division. 2013.

11. Nutrition Division, Department of Health, Ministry of Public Health. The 'Thai People Flat Belly' campaign. 2010. [WWW document]. URL [http://eng.anamai.moph.go.th/images/Pic\\_News/Poster\\_HO.pdf](http://eng.anamai.moph.go.th/images/Pic_News/Poster_HO.pdf) (accessed 21 April 2013).

12. Saiwongse N, Kitvorapat W. Healthy Organization for Thai People Flat Belly. [WWW document]. URL [http://eng.anamai.moph.go.th/images/Pic\\_News/Poster\\_HO.pdf](http://eng.anamai.moph.go.th/images/Pic_News/Poster_HO.pdf) (accessed 2 July 2013).

13. The Royal College of Physicians of Thailand. Introduction on Network of Fatless Belly Thais. [WWW document]. URL [http://www.raipoong.com/content/detail.php?slug=news\\_about^page\\_size-full\\_width&header=no](http://www.raipoong.com/content/detail.php?slug=news_about^page_size-full_width&header=no) (accessed 2 July 2013).

14. Thai Health Promotion Foundation. 60 Outstanding Performances 2001–2009 Thai Health Promotion Foundation, p 155 & 161. [WWW document]. URL [http://en.thaihealth.or.th/system/files/60\\_showases\\_Eng\\_\(Edited\\_26\\_Jan\\_2011\)\\_nong.pdf](http://en.thaihealth.or.th/system/files/60_showases_Eng_(Edited_26_Jan_2011)_nong.pdf) (accessed 2 July 2013).

15. Kulsomboon V. Prevention of Child Obesity: Consumer Protection on TV Advertisement Presentation to the First Annual Meeting of Food and Nutrition Policy on Health Promotion Program (FHP) 'Dealing with Unhealthy Diet in the era of AEC: Is Thailand Ready?' 15 January 2013, Chatrium Hotel Riverside Bangkok.

16. Kulsomboon V. Thai public invited to help shape health policies. *Bull World Health Organ* 2009; 87: 89–90. [WWW document]. URL <http://www.who.int/bulletin/volumes/87/2/09-030209.pdf> (accessed 2 July 2013).
17. National Health Commission Office of Thailand. Management of Overweight and Obesity, Agenda Item 3.9, Second National Health Assembly 18 December 2009. [WWW document]. URL <http://en.nationalhealth.or.th/sites/default/files/9-2009-3.pdf> (accessed 2 July 2013).
18. National Health Commission Office of Thailand. Strategies for Management of Overweight and Obesity 2010–2019, Agenda 3.9: Annex, Second National Health Assembly, 18 December 2009. [WWW document]. URL <http://en.nationalhealth.or.th/sites/default/files/9-2009-4.pdf> (accessed 2 July 2013).
19. Slining MM, Herring AH, Popkin BM, Mayer-Davis EJ, Adair LS. Infant BMI trajectories are associated with young adult body composition. *J Dev Orig Health Dis* 2013; 4: 56–68.