School lunch menu preparation manual for developing countries:

Based on an Indonesian school lunch training case

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Aim of the manual

Food service is an intervention method used to improve people's nutritional status. In Japan, food service is a systematized process through which meals are served continuously to large designated groups, with the aim of managing the nutrition to the people served. Food management is implemented to clarify the nutritional issues in a target population, Create a meal plan ensuring appropriate quality to address the issues, cook and serve the meals, construct an evaluation system for obtaining results, and secure the resources required. In schools, the lunches served to children play an important role in improving their nutritional status. In the workplace, office meals contribute to increase labor productivity by improving the nutritional status of workers. Beyond Japan, many other countries around the world also implement food service as an important means of improving people's nutrition.

To reach the sustainable development goals (SDGs) adopted in 2015, there is increased momentum in the international community to improve the nutrition of children, particularly those in developing countries, and various stakeholders in Japan are seeking ways to contribute to this effort. Developing countries vary widely in their implementation of school lunch systems, ranging from those starting to systematize school lunches to those in which school lunches are widespread but suffer from issues with nutrition management, hygiene management, and evaluation. Japan has a long history of providing school lunches; associated laws have been developed and systematized, and has effective systems for nutrition management, hygiene management, and nutritional education. Therefore, there is academic and social significance in disseminating Japan's experience with school lunches to an international audience.

July 2018, international activities promotion committee of The Japanese Society of Nutrition and Dietetics published a special issue of the *Japanese Journal of Nutrition and Dietetics* on the topic of "school lunches," containing a collection of papers in English on activities used to improve nutrition in Japan and approaches to improving nutrition in various other countries. In November 2018, a one-week workshop was implemented for teachers in the regional nutrition department of a local university in Indonesia, the country with the lowest prevalence of school lunches among those discussed in the special issue. The workshop offered lectures and practice sessions on the framework of and methods for food service and nutrition management, and created an example menu for junior high school students residing in a dormitory. This manual systematizes the procedures for food service and menu creation based on the training content on school lunches in Indonesia. The goal is to provide know-how to facilitate appropriate meal service based on an understanding of a particular group's nutritional issues, regardless of the objective group. We hope that the manual will be of use to developing countries in Asia and Africa that wish to develop and implement school lunch and office meal programs, and thereby contribute to the improvement of global nutrition.

This manual was jointly created by The Japanese Society of Nutrition and Dietetics and Ajinomoto Co., Inc.

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1. Understanding basic local information

To serve food in developing countries, it is essential to first identify the local area's typical meals, food culture, health and nutritional issues, and food service management. Following is a summary of the basic topics that should be examined and understood.

1.1. Local meals, food culture, and dietary environment

1.1.1. Meals and dietary environment: What are the typical local meal patterns (staple foods, foods that are the main sources of various nutrients)? Are any foods or dishes commonly eaten? If so, what are they and what nutrient intake characteristics do they have? Where do people obtain food and meals? How is food prepared? Who eats the food and when? What role does the food have in daily lives, and what is the local style of eating?

1.1.2. Food culture: What is the local food culture (including background, such as the influence of religion and gender)? What are the characteristic cooking methods and seasonings (flavor profiles)?

1.1.3. Food: What foods are locally available? What are the characteristics of food production and distribution (imported food consumed in large quantities, distribution period (Column (1) Market survey)?

1.1.4. Taste: What are people's criteria for determining taste and level of satisfaction?

1.1.5. Nutrition: How do the local people understand and recognize nutrition?

1.2. Local health and nutritional issues

1.2.1. Health issues: What health issues are problematic in the local area (particularly those related to meals and nutrient intake), and what type of diet is considered appropriate to resolve them?

1.2.2. Health survey: Has a national health survey been implemented? If so, obtain the report.

1.2.3. Nutrition survey: Has a national nutrition survey been implemented? If so, obtain the report.

1.2.4. Regional differences in issues: What issues exist at the national and regional levels? Are there disparities with local issues?

1.3. Local food service management

1.3.1. Implementation of food service for specific groups

- Is there legislation relating to food service for specific groups (e.g., school lunches, office meals, hospital meals, etc.)?
- What is the format and scale of food service in the local area (e.g., meals prepared onsite, catering service with meals prepared offsite)?
- What methods are used to procure materials for serving meals?

1.3.2. Specialist system to support food service operations

- Does the country have a registered dietician/dietician accreditation system? If so, confirm its history, education system, and certification system.
- Confirm the placement of registered dieticians/dieticians—how many dieticians are allocated to venues that serve group meals (e.g., hospitals, company cafeterias, private schools, public schools, etc.)?
- What laws and regulations are related to the registered dietician/dietician accreditation system?
- Does the country have a chef accreditation system? If so, confirm its history, education system, and certification system.
- Confirm the placement of chefs—how many chefs are allocated to venues that serve group meals (e.g., hospitals, company cafeterias, private schools, public schools, etc.)?

- What laws and regulations are related to the chef accreditation system?

1.3.3. Development of nutrition management

- Obtain the country's own food composition table and nutritional calculation software, if available. Have nutritional calculations have been conducted in a national nutrition survey? If so, confirm the nutrients included in the calculations.
- Obtain dietary reference intakes established by the Department of Health, Ministry of Agriculture, or analogous bodies, if available.
- Obtain textbooks and reference books on nutrition management used in local universities, if available.

1.3.4. Hygiene management

- Is a legal system in place governing hygiene for food service material management and facilities?
- Confirm the water source and sanitation of water used for drinking and cooking.
- Confirm the water source and sanitation of water used to wash used cookware and eating utensils.
- What hygiene management is implemented by chefs in the country's food industry, not just in food service (e.g., handwashing before cooking, having chefs wear masks, hats, gloves, etc.)?
- Are health checks implemented for chefs? If so, confirm the items checked.
- Confirm the hygienic behavior of people in their daily lives and the status of hygiene education.
- Confirm the status of health problems caused by food.

1.4. Locally available resources for food service (people, materials/money, equipment, methods, information)

1.4.1. People

- How many human resources are directly involved in food service operations (i.e., registered dieticians/dieticians and chefs)? What is their level of skill (experience)?
- What is the status of material suppliers and producers? Who are the sources of information when procuring materials?
- What is the status of human resources and labor management in places that serve meals (e.g., hospitals, company cafeterias, private schools, public schools, etc.)?
- How many people generally work in the locations that serve meals? How many meals are served over how many hours, and using what method?

1.4.2. Materials/money

- Are there restrictions on the availability of materials and consumables (food types and quantity) for large quantities of food (necessary number of people)? If so, confirm what is available.
- Confirm the timing of material orders and delivery based on various conditions.
- Confirm the costs involved in food service operations and the breakdown of those costs (materials, utilities, human resource, facility, etc.).
- Who is responsible for the aforementioned costs?

1.4.3. Equipment

- Confirm the available facilities, such as the kitchen, pantry, and cafeteria, and the equipment within these areas. Is the kitchen zoned hygienically? What is the condition of the floor in the kitchen and other areas? Do workers wear shoes? What is the status of ventilation situation, etc.?
- Identify the heat source for cooking, the status of water and sewage facilities, and the capabilities of the installed cooking equipment.

- Are the kitchen, pantry, and cafeteria located in the same building, in adjacent buildings within the same grounds, or in dispersed buildings?
- Does the structure of the kitchen and other areas allow the entry of small animals, insects, etc.?
- What equipment is used to store materials (are there refrigerated or frozen storage facilities)?
- Is the equipment appropriate for the number of meals to be served, or for cooking the planned menu?

1.4.4. Methods (system)

- What cooking and serving system is appropriate based on the condition of the facility equipment and the menu (e.g., conventional system, commissary system, cook-serve system, ready food system)? What quality control and hygiene management methods are appropriate based on the food serving methods (e.g., cafeteria style, container serving style, etc.)?

1.4.5. Information

- Confirm information on the number of meals served (sales), accounting, food service users, and competition.
- What are the physical characteristics and nutritional status of the user group? Are there individuals who need special health considerations for food service?

2. Concept of food service management

2.1. Procedures for food service operation

2.1.1. Nutritional assessment of the group and identification of dietary nutrient targets

- Determine the nutritional status of the group and how much energy and nutrients are required to improve their nutritional status. Clarifying the quality, quantity, and characteristics of meals to use as teaching material for nutrition education is the most important task to achieve the aim of food service: improved nutrition of the people eating the served meals.

2.1.2. Determination of meal patterns and food composition

- Determine the food required to supply the necessary energy and nutrients (determined above) and estimate the quantity needed. Consider the composition of meals in terms of culinary units, such as staple foods, main dishes, and side dishes; then consider the composition in terms of food groups to identify the main materials of each culinary unit.
- Determine what amount of the staple food should be supplied by determining the percentage of energy supplied by the staple grain, the grain/energy ratio, and thus, the amount of energy derived from grains.
- Subtract the amount of protein supplied by the staple food from the target, and determine whether the remaining protein can be provided by the protein source food group. Consider the distribution of major foods that constitute animal and plant-based protein sources.
- After considering the energy and nutrients supplied by grains and protein sources, determine the amount of vegetables, potatoes, seaweed, mushrooms, fruit, etc. required to reach the target nutrient supply.
- When considering food compositions, it is important to base decisions on the available materials and their purchase costs.

2.1.3. Menu creation

- Create a menu for a fixed period. A period of one month is a rough indication based on the frequency of serving lunch.

- Create a menu to ensure that the average amounts during the specified period match the target nutrient allowance based on meal pattern and food composition.
- When creating a menu, it is important to consider not only nutritional quality but also the menu's ability to satisfy diners' taste and quantity preferences, facilitating consumption without any leftovers.
- It is also important for the menu to reflect the conditions on the preparation side. The menu must be feasible with respect to the meal preparation facilities, the number of cooks and available technology, the time required for cooking, and the budget for materials.

2.1.4. Cooking planning

- Decide on serving time according to the cooking and serving system. Calculate backwards according to the estimated cooking time to determine the cooking start time. Also consider and accommodate the time required to dish up and serve food after cooking.
- Determine zones for various types of work, such as washing and cutting ingredients, heating, seasoning, and dishing up; allocate time for each task and determine who will perform it.
- Determine the heat source to be used for cooking and the order in which equipment will be used.
- Identify work with hygiene management risks, which requires caution during cooking, and confirm the necessity of caution.

2.1.5. Cooking procedures

- Perform cooking tasks according to the cooking plan.
- Dish up and serve meals: Plate up meals according to the dining area, dishing-up method, etc., and serve the meals according to the service method.

2.1.6. Clean-up

- Wash equipment and utensils used for cooking, wash dishes used for eating after meals are finished, and clean the work area, floor, and sink. Dispose of any food waste generated during cooking and any leftover food.
- Maintain the cleanliness of areas like the kitchen and cafeteria.

2.2. Securing resources for food service operation

Before beginning food service, investigate and secure resources (all the items described in section 1.4) needed to achieve meals with suitable quality, quantity, and image for the target group. It is particularly important to decide on a method (system) and facilities. Facilities must be considered and chosen in accordance with the methods; the kitchen and cafeteria must be designed and built; a location for food service operations must be secured; and personnel must be acquired.

Procurement of both facilities and personnel is restricted by budgetary constraints, such as capital investment and labor costs. It is thus vital to investigate the details of the resources to be used after clarifying the aim of the food service, including the level of quality required.

2.3. Evaluation

Using the menu period as one cycle, evaluate the target group's consumption status, the menu's nutritional quality, the cooking tasks, and the budget and expenditures (e.g., material costs), then link this evaluation with improvements to the menu and cooking work. Record any hygiene management issues (incidents and accidents) and adopt measures to prevent food poisoning. Record any injuries sustained by cooks and adopt measures to ensure safe implementation of cooking tasks.

Indonesia training example

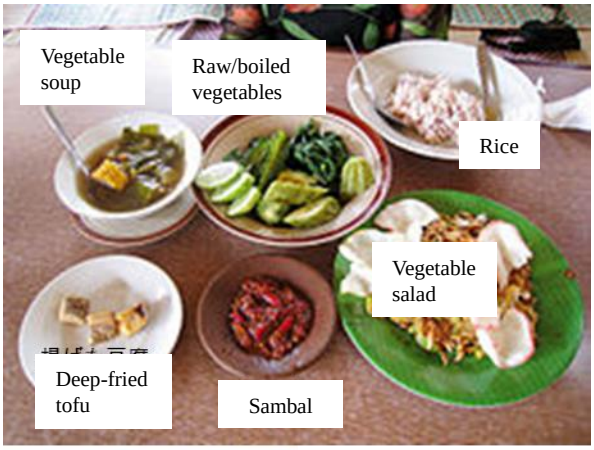
We conducted a group investigation of on Indonesian meals, food culture, health and nutritional issues, and food service operation management (we were unable to cover all items listed in sections 1.1-1.3), and established a venue to consider the current state of the Indonesian dietary environment and suitable kinds of food service.

(1) Meals of Indonesia: What are the typical menus/dishes? When, where, what, and how do people eat?

When/where: *Breakfast is eaten at 6 am (at home, at school, or in the workplace), lunch is eaten between 11 am and 1 pm (at school or in the workplace), and dinner is eaten between 5 pm and 8 pm (at home or eating out).*

What: *The energy intake and pattern of a single full meal is as follows: 1/3 staple food consisting of rice (carbohydrate source), 1/3 vegetables, 1/6 fruit, and 1/6 protein source (such as a meat or fish side dish). It is typical for noodles to be served as a single dish.*

How: *Meals are obtained directly, by cooking the meal oneself, requesting catering, or purchasing cooked meals. Foods are eaten raw or cooked by deep frying, boiling, steaming, or frying.*



Typical Sundanese cuisine

(2) Food culture: Strengths and weaknesses

Strengths: *Because Indonesia has many ethnic groups, the range of foods is diverse, people tend to eat with their family and friends, foods use healthy herbs and spices, and a variety of foods are related to faith or religious practices.*

Weaknesses: *Poor nutritional balance, high intake of rice, unhealthy cooking methods (particularly excessive use of oil), high intake of carbohydrates such as sugar, and unsanitary conditions.*

(3) Diet-related health problems

Excessive carbohydrate intake, prioritization of quantity over quality, NCDs (diabetes, heart disease, hypertension, high cholesterol), anemia and iodine deficiency, and foodborne diseases caused by poor hygiene.

(4) How to connect health and food

In addition to the double burden of malnutrition, loss of traditional food culture and meals with poor nutritional balance were identified as issues. Methods proposed to improve these problems included increased intake of dietary fiber, meals with good nutritional balance, and promotion of delicious and simple cooking methods.

(5) Food service in Indonesia: Real situation, problems, and solutions

A common theme noted among all groups was that, whereas cooks have been and are regarded as important in Indonesia, the importance of nutritionists has not been recognized. Participating teachers of meal service courses shared that in Indonesia, hiring of nutritionists is mandated only in hospitals, and no nutritionists are employed by other locations that serve food (schools and workplaces); additionally, chefs receive no training on menu preparation, etc. University-level nutritionist training programs were only initiated in 2005. From 1956 to 2005, only specialist schools were available; currently, only large-scale catering companies are obligated to hire a minimum of two nutritionists.

No lectures on nutrition are included within Indonesia's compulsory education. In elementary school, food and nutrition are touched upon only as part of natural science, whereas in junior high school the topic is mentioned as part of biology. Although the participants had adequate knowledge of nutrition, they could not imagine the work of a nutritionist who actually served food. The mission of the workshop was thus to teach these participants about food service management.

Column 1. Market survey

To understand the specific composition of locally available foods, food distribution, and distribution periods, it is essential to inspect major supermarkets, fresh markets, local shops, etc. During the Indonesia training, we visited major supermarkets and the fresh market actually visited by the person responsible for making the lunches to purchase food; we inspected the materials being sold and the freshness of those materials. In major supermarkets, the vegetables were not fresh and the products were expensive, so our investigation confirmed that when actually purchasing materials for lunches, it is better to buy from individual vendors at the fresh market (vegetables, fish, dried goods, bean products, etc.). We collected information on the sales units and prices of food sold at the fresh market and listed the information as shown below.

List of food prices

No	Food item	Unit	Price per Unit (Rp)
	Makanan Pokok/*Staple food*		
1	Beras Giling/*Rice*	kg	10,000
2	Bihun/Vermicelli	400 gr	9,000
3	Jagung/Corn	kg	14,000
4	Kentang/Potato	kg	16,000
5	Singkong/Cassava	kg	4,000
6	Mie (kering)/Noodle (dry)	200 gr	5,600
7	Roti Putih/Bread	pack	15,000
8	Tepung Terigu/Flour	kg	7,500
9	Ubi Jalar/Sweet potato	kg	3,000
	Makanan sumber protein nabati/Plant based protein		
1	Kacang Hijau/Mung bean	kg	14,000
2	Kacang Merah/Red bead	kg	40,000
3	Kacang Tanah kering berkulit/dry nut	kg	26,000
4	Kembang Tahu/Tofu Skin	bks	6,000
5	Tahu/Tofu	bks	4,000
6	Tempe Kedelai/Tempeh	bks	4,000
	Makanan sumber protein hewani/Animal protein		
1	Ayam/Chicken	kg	34,000
2	Daging Sapi/Beef meat	kg	110,000
3	Telur Ayam/Egg	kg	22,000

3. Overview of school lunch service management

As shown in Chapter 1, the context surrounding food varies widely from country to country. However, an understanding of the basic components of food service operation and management is vital for developing food service in local regions. The basic components of food service operation and management are explained using a flowchart (Figure 1) based on the example of school lunches in Japan; thus, all concerned parties can understand the outline of the system.

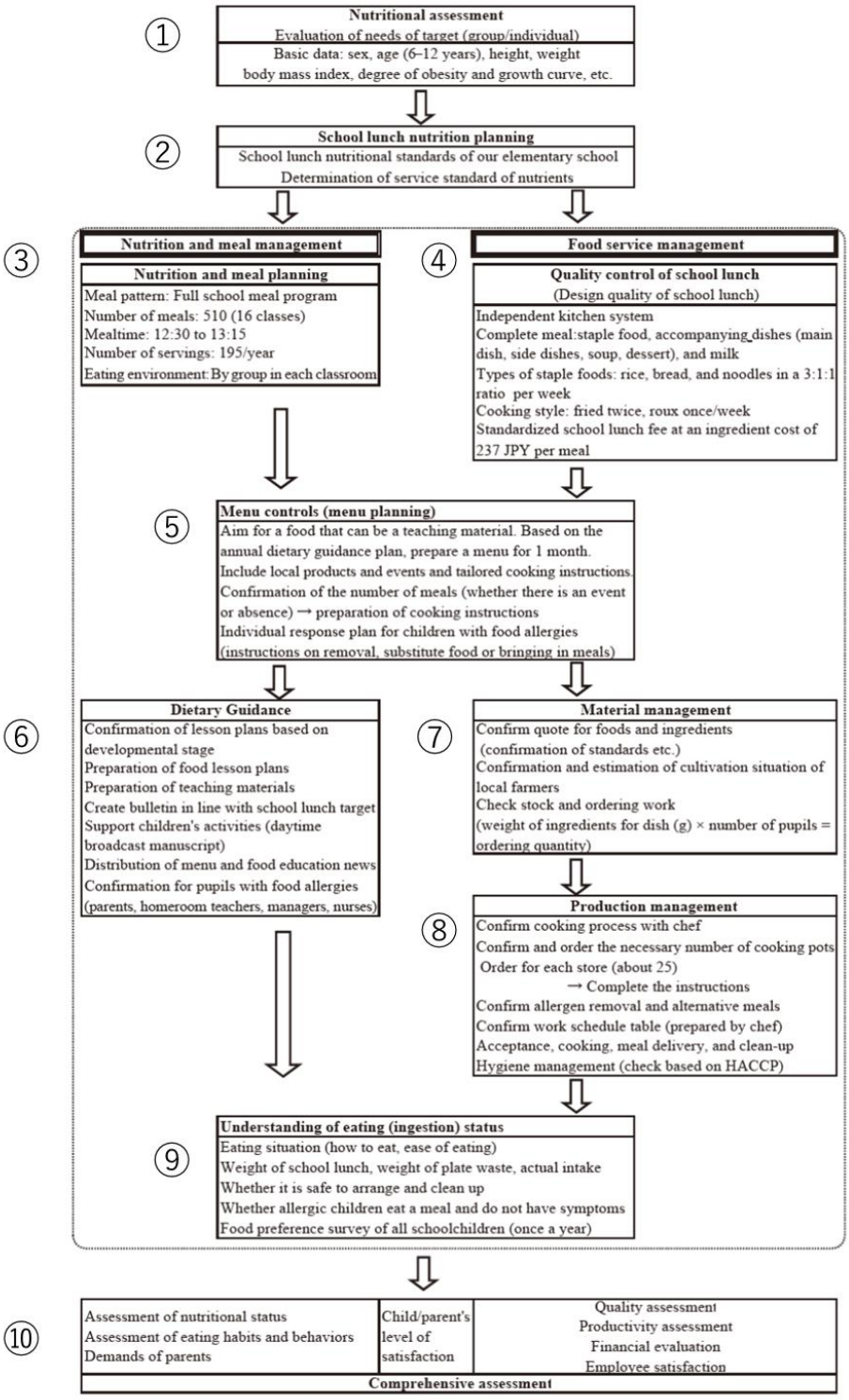


Figure 1 Flowchart of the procedures used in the present study

Figure 1. Flowchart of business administration for Japanese school lunches (Nagura H & Takahashi S, 2018)

3.1. Evaluation of target group's needs and nutritional assessment

See Figure 1 (1). Determine the characteristics of the target group (personnel composition by gender and age group, physical activity, height, weight, BMI, degree of obesity, position on growth curve, etc.).

3.2. Nutritional planning/measures

See Figure 1 (2). Determine the daily target nutrient allowance in the target group, based on the information presented in section 2.1, and create a nutrition education plan. Investigate which daily meal the served meal corresponds to (lunch, etc.), and determine what percentage of the daily target nutrient allowance the meal provides. Determine the appropriate target nutrient allowance for one meal, taking into account the feasibility and priority of nutritional issues within the limited available resources. Energy and protein amounts are essential for setting the target. It is best to set the lipids/carbohydrates composition ratio as the energy ratio. Determine the necessary nutrients to provide vitamins, minerals, dietary fiber, and sodium content, considering the regional nutritional issues and priorities.

3.3. Nutrition/meal management

See Figure 1 (3). Confirm the types (set meals, buffet-style meals) and number of meals served, mealtimes, the number of times meals are served in one week, the annual service schedule, and eating location.

3.4. Food service management

See Figure 1 (4). Confirm whether meals are served from cooking facilities onsite or prepared at an external facility and provided to multiple schools. Confirm the meal content (staple food, main dish, side dish, soup, milk, etc.), staple food form (rice, bread, noodles), cooking style, tableware and eating utensils, and food service cost (per meal, per month, etc.). Investigate guidelines for the amount of the main food that can ensure the target nutrient allowance per meal.

3.5. Menu management (menu planning)

See Figure 1 (5). Create a menu for a fixed period (one month) based on the nutrition education plan. Make adjustments during the set period, using a variety of foods by varying the main ingredients and cooking methods. Use a menu that can allow the meals to be used for nutrition education. Consider menus that incorporate local materials and events, making the most of local characteristics. Create daily cooking instructions based on the menu for a fixed period (one month). Create individual response plans for children with food allergies or other specific dietary requirements.

3.6. Nutrition education

See Figure 1 (6). Create a lesson plan based on developmental stage. Create a bulletin in line with the school lunch target. Create a menu list and lunch news.

3.7. Material management

See Figure 1 (7). Estimate acquisition methods and costs based on the food and material usage plan. When procuring materials directly from local farmers, confirm their cultivation status in line with the amount to be used, and check the cost. Separate nonperishable food that can be stored from fresh food that should not be kept for hygiene reasons, and perform inventory and ordering control. Confirm that delivered materials match the orders (quality, quantity, price).

3.8. Production management

See Figure 1 (8). Formulate a preparation process for each dish (example: weigh materials ⇒ wash ⇒ peel ⇒ cut ⇒ simmer/boil ⇒ season ⇒ simmer/boil ⇒ serve) and a work plan for chefs, specifying who is responsible for what process, for each day of cooking. Plan how much food to cook at one time in accordance with the facilities to ensure that food is cooked safely and efficiently. Integrate the plans for each dish and adjust staffing (work assignments) and work times to prevent task overlap, duplicated use of heating equipment, etc. Consider placement and order of cooking tasks. Adjust the cooking time for each dish, calculating backwards from the predetermined serving time decided. It is useful to create a simple

diagram of the kitchen layout for this purpose.

Hold a meeting to explain the final cooking procedures and work plan to the workers (chefs) in advance. Confirm action plans (such as removal of allergens) for people with special health considerations (particularly children). Identify tasks that pose the greatest hygiene risk and communicate to the chefs when handwashing is required before and after performing a task, when different utensils should be used for different tasks, and measures to prevent cross-contamination of contaminated food (e.g., uncooked meat) and non-contaminated food (e.g., heated dishes prior to serving). Encourage attention to these points while working.

3.9. Hygiene management

3.9.1. Personal hygiene management

- Check chefs' health status regularly (annually) and on the day of cooking.
- On the day of cooking, confirm that chefs are in good physical condition with no diarrhea, vomiting, or fever.
- Chefs' nails should be kept short.
- Clean, dedicated chef uniforms should ideally be prepared, to be worn while cooking. It is also essential for chefs to wear a hat to cover the hair.
- Chefs should remove jewelry such as rings before beginning work.
- Ensure the chefs to wash their hands before cooking and when they change tasks during work.

3.9.2. Food hygiene management

- Food with different hygiene requirements must be kept separate during storage before cooking, cooking, and storage of cooked food (e.g., do not store uncooked fish and meat with food eaten raw; do not store hot food and cold food together; etc.).
- Do not serve prepared dishes in the same location used for processing fish and meat before cooking.
- Do not leave fresh animal-based produce, such as fish, meat, and eggs, at room temperature for long period of time during cooking.
- Thoroughly wash foods contaminated with dirt.
- Foods that must be heated should be sufficiently heated; if possible, measure and record the temperature with a thermometer. Ensure that food is heated to 75°C or above for at least one minute.
- Manage cooking times to ensure that dishes can be served and eaten promptly (do not allow cooked dishes to sit for long period of time).
- Store cooked dishes so that insects do not have access to the food.

3.9.3. Facility/equipment hygiene management

- Arrange and organize cooking utensils and equipment to ensure that clean items can be used.
- Do not leave garbage on the floor in the kitchen. Prevent the floor from getting wet as much as possible during cooking. Do not cook or leave food within reach of water splashing up from the floor.
- Follow appropriate clean-up procedures after cooking (wash used dishes and utensils, store equipment in a clean location, dispose of garbage, etc.).
- Keep water containers and the sink used for washing food and cleaning.
- Dry and put away dishes and utensils after washing.

3.10. Assessment of eating (intake) status

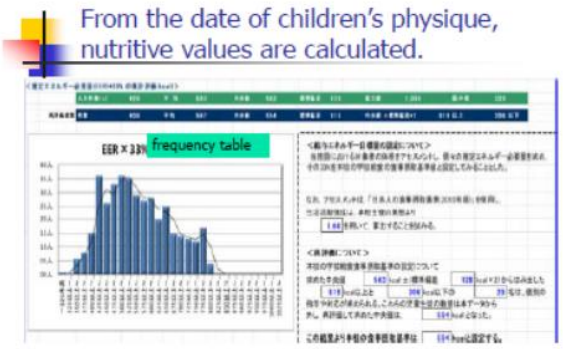
See Figure 1 (9). Confirm children's eating status (how they eat, ease of eating), serving amount, and amount of

remaining food (leftovers) to ascertain actual intake, and use those findings to evaluate whether serving and intake amounts are suitable. Conduct surveys annually to determine whether the meals have been safely delivered and cleared away, whether any children with allergies presented with symptoms, etc.

3.11. Comprehensive assessment

See Figure 1 (10). Comprehensively assess both children and parents. For children, assess nutritional status, dietary habits, dietary behavior, and awareness of food. For parents, assess whether they are satisfied with the school lunches.

Example slides used in the Indonesia training to explain Figure 1



Corresponds to Figure 1 (1)

Corresponds to Figure 1 (2)

Corresponds to Figure 1 (3)

Corresponds to Figure 1 (5)

Corresponds to Figure 1 (5)

Corresponds to Figure 1 (6)

4. Creation of a school lunch menu (local deployment)

Based on the guidelines in Chapter 3, create a menu compatible with the local area. In ideal circumstances, the full flowchart demonstrated in Figure 1 for Japan should be followed, but it is assumed that many countries have not yet attained that stage. This chapter explains methods for creating a menu based on the actual example used in the Indonesia training, which selected options from the Chapter 3 content that were considered the minimum requirements for deployment in developing countries. The example menu was created for junior high school students living in a dormitory.

4.1. Confirmation of resources

Confirm the resources (see section 1.4) available in the location that will actually serve the meals.

- **People:** Is there a nutritionist (and is that person qualified)? Who is the chef (and is that person qualified)?
- **Materials:** Where are materials procured from?
- **Money:** What are the costs of materials, consumables, utilities, etc.?
- **Facilities:** Are contaminated areas and non-contaminated areas separated? Is there a garbage collection point? Is the flooring wet, dry, or dirt? What is the condition of the kitchen facilities (water, electricity, heating, fuel, number of sinks) and cooking equipment (number of pots, availability of ovens, fryers, rice cookers, mixers, etc.)?
- **Information:** How is information on food obtained? Organize the acquired information.

4.2. Evaluation of the target group's needs and nutritional assessment

Corresponds to Figure 1 (1). Ascertain the target group's gender (essential), age (essential), height, weight, BMI, degree of obesity, position on growth curve, etc. (within attainable scope). Confirm the minimum information upon which the target country's recommended dietary allowance (RDA) is based. In Indonesia, the RDA for junior high school students is set based on gender and age, so during the training we ascertained the gender and age composition of the target group.

4.3. Nutritional planning/measures

Corresponds to Figure 1 (2). Calculate the RDA based on the gender and age composition of the target group. Determine the target nutrient allowance to ensure that the nutrient amount of one meal corresponds to one-third of the RDA.

4.4. Nutrition and meal management

Corresponds to Figure 1 (3). Confirm the types and number of meals to be served, the mealtimes, the number of times meals will be served in one year, and the eating environment.

Indonesia training example

We envisioned serving lunches to 400-500junior high school students living in dormitories. Meals were to be eaten in the dormitory cafeteria.

Most Indonesian junior high school students are 13-15 years old, so the target nutrient allowance was calculated using the RDA for 13- to 15-year-olds. For the calculations, the ratio of males to females was assumed to be 1:1, so the mean for male and female RDA for 13- to 15-year-old children was used.

Because the target group was junior high school students, who are at the stage of pubertal growth, anemia and calcium deficiency were envisioned as nutritional issues. Calcium and iron were thus included in the target nutrient allowance calculations in addition to the main nutrients.

Indonesian RDA

	Energy (kcal)	Protein (g)	Carbohydrates (g)	Calcium (mg)	Iron (mg)
13-15 years (boys)	2,475	72	340	1,200	19
13-15 years (girls)	2,125	69	292	1,200	26
13-15 years (mean for both genders)	**2,300**	**70.5**	**316**	**1,200**	**22.5**

Source: Ministry of Health of the Republic of Indonesia, *Ministry of Health of the Republic of Indonesia Regulation Number 75 Year 2013 on Recommended Dietary Allowance for Indonesian People*, Jakarta, Indonesia, 2013.

4.5. Food service management

Corresponds to Figure 1 (4). Confirm the meal content (staple food, main dish, side dish, soup, milk, etc.), type of staple food (rice, bread, noodles), cooking method, and lunch cost.

Indonesia training example

The lunch cost was IDR 10,000 (approximately JPY 100) per meal.

In Indonesia, a meal is not considered complete without rice. Thus, the staple food for meals was rice, served with a combination of a main dish (protein source), side dish (vegetables), and fruit.

4.6. Menu management (menu planning)

Corresponds to Figure 1 (5). In Japan, a menu is created for one month's worth of meals; however, it is assumed that many countries may not have such a repertoire of dishes. In the Indonesia training, it was only possible to plan a menu for approximately one week. The following tasks can be undertaken to increase the menu repertoire.

4.6.1. Step 1 - Create dishes

The variation of dishes can be increased by listing locally available materials and multiplying these materials according to the cooking methods commonly used in the local area. We created a matrix with protein source materials listed in the rows and cooking methods listed in the columns (Matrix 1, red), as well as a matrix with vegetables listed in the rows and cooking methods listed in the columns (green matrix). In addition, aligning the carbohydrate source (yellow), which is the staple food, enables visual understanding that the meal is nutritionally well-balanced.

Matrix 1: Examples of protein dishes

		2. Cooking method				
		boil with coconut milk	boil	steam	fry	stir fry with soy sauce
1. Protein source	tempe	lodeh tempe	semur tempe	pepes tempe	tempe goreng	
	chicken	opor ayam	sop ayam		ayam goreng lengkuas	ayam kecap
	tofu	opor tahu	semur tahu	pepes tahu	tahu goreng	tahu lada hitam
	egg	opor telur	semur telur		telur dadar	telur ceplok bumbu kecap
	etc					

Matrix 2: Examples of vegetable dishes (source of vitamins and minerals)

		2. Cooking method				
		boil with coconut milk	boil	steam	fry	stir fry with kecap sauce
2. Vitamin & mineral-source	spinach		bening bayam			tumis bayam
	cassava leaf	gulai daun singkong				
	sprout		sayur toge			tumis toge
	unripened jackfruit	gulai nangka muda				
	etc					

Tips for increasing the variation of dishes:

- Create new dishes by substituting different cooking methods or ingredients used in basic dishes.
- Group created dishes according to various methods. *Example:* List by protein source (e.g., chicken dishes, fish dishes, etc.), cooking method (e.g., deep frying, frying, boiling (soup), etc.), or vegetables (e.g., dishes using leafy greens, potato dishes, mixed vegetables, etc.).

4.6.2. Step 2 - Create dish cards

Create dish cards for all dishes created in Step 1. Include the following information:

- Recipe
- Number of cooking procedures
- Nutrients
- Price

Menu: Fried chicken with galngal seasoning

Supplier		Ingredient	Preparation method	Cooking guidance	Consumption amount (g/person)	Nutrient value (per person)					Order amount (kg)	Actual order amount (kg)	Unit price (IDR)	Total cost (IDR)
						Energy (kcal)	Protein (g)	Carbohydrate (g)	Calcium (mg)	Iron (mg)				
	Fried chicken with galangal seasoning	Chicken	deep fried	1. Puree garlic, shallot, curcumin, candlenut, and salt 2. Heat palm oil, fry the ground spices, add bay leaf, lemongrass, sugar and pepper until fragrant 3. Put fresh chicken into pan, mix it. Add some water and boil until done and put aside 4. Heat palm oil in pan, deep fry the chicken until golden brown	100	190.00	19.10	0.00	11.00	2.90	45.5	45.5	34,000	1,547,000
		Garlic	chopped		1	0.95	0.04	0.01	0.00	0.00	0.455	0.5	28,000	14,000
		Shallot	chopped		1	0.39	0.01	0.00	0.00	0.00	0.455	0.5	30,000	15,000
		Candlenut	chopped		1	6.36	1.21	0.10	0.08	0.00	0.455	0.5	60,000	30,000
		Galangal	chopped		3	1.26	0.02	0.00	0.01	0.00	1.365	1.4	10,000	14,000
		Curcumin	chopped		1	0.63	0.01	0.00	0.00	0.00	0.455	0.5	6,000	3,000
		Pepper	chopped		0.2	0.72	0.08	0.05	0.24	0.04	0.091	0.1	100,000	10,000
		Salt	chopped		0.2	0.00	0.00	0.00	0.00	0.00	0.091	0.1	14,000	1,400
		Sugar	chopped		0.2	0.43	0.00	0.11	0.00	0.00	0.091	0.1	14,000	1,400
		Bay leaf	chopped		0.1	0.04	0.00	0.00	0.00	0.00	0.0455	0.05	8,000	400
		Lemongrass	chopped		0.1	0.05	0.00	0.00	0.00	0.00	0.0455	0.05	10,000	500
		Palm oil	chopped		10	38.90	9.10	0.00	0.00	0.05	4.55	5	14,500	72,500
					Total	**239.72**	**29.58**	**0.27**	**11.33**	**2.99**				**1,709,200**

Using combinations of dishes and presenting example formats including nutrition and cost calculations

enables users to understand that, depending on the combination used, innumerable menus can be deployed in a format that accommodates the necessary nutrition value and cost.

4.6.3. Step 3 - Consider daily menu combinations based on dish card information

Using the combination of rice (Dish 1), deep fried chicken (Dish 2), and spinach soup (Dish 3), cooking instructions for one day were created, as shown below, summarizing the following information:

- Recipe
- Number of cooking procedures
- Nutrients
- Price

Cost per person was calculated to be IDR 6,533, and thus confirmed to be below the target cost of IDR 10,000. Nutrient calculations indicated that, with the exception of calcium, target nutrient levels were almost reached, with RDA contribution ratios of 30% for energy, 40% for protein, 31% for carbohydrates, and 32% for iron.

4.6.4. Step 4 - Create a one-week menu based on dish card information

A one-week menu (Day 1 to Day 7) was created. The Day 1 and 7 examples are shown below.

Cooking instructions: Day 1

Supplier		Ingredient	Preparation method	Cooking guidance	Consumption amount (g/person)	Nutrient value (per person)					Order amount (kg)	Actual order amount (kg)	Unit price (IDR)	Total cost (IDR)
						Energy (kcal)	Protein (g)	Carbohydrate (g)	Calcium (mg)	Iron (mg)				
	Steamed Rice	Rice	steamed	Wash rice and steam	100	360	6.8	78.9	6	0.8	45.5	45.5	10,000	455,000
	Fried chicken with galangal seasoning	Chicken	deep fried	1. Puree garlic, shallot, curcumin, candlenut, and salt 2. Heat palm oil, fry the ground spices, add bay leaf, lemongrass, sugar and pepper until fragrant 3. Put fresh chicken into pan, mix it. Add some water and boil until done and put aside 4. Heat palm oil in pan, deep fry the chicken until golden brown	100	190.00	19.10	0.00	11.00	2.90	45.5	45.5	34,000	1,547,000
		Garlic	chopped		1	0.95	0.05	0.23	0.42	0.01	0.455	0.5	28,000	14,000
		Shallot	chopped		1	0.39	0.02	0.00	0.36	0.01	0.455	0.5	30,000	15,000
		Candlenut	chopped		1	6.36	0.19	0.08	0.80	0.02	0.455	0.5	60,000	30,000
		Galangal	chopped		3	1.26	0.05	0.28	7.68	0.17	1.365	1.4	10,000	14,000
		Curcumin	chopped		1	0.63	0.02	0.09	0.24	0.03	0.455	0.5	6,000	3,000
		Pepper	chopped		0.2	0.72	0.02	0.13	0.92	0.03	0.091	0.1	100,000	10,000
		Salt	chopped		0.2	0.00	0.00	0.00	0.04	0.00	0.091	0.1	14,000	1,400
		Sugar	chopped		0.2	0.43	0.00	0.11	0.00	0.00	0.091	0.1	14,000	1,400
		Bay leaf	chopped		0.1	0.04	0.00	0.01	0.26	0.01	0.0455	0.05	8,000	400
		Lemongrass	chopped		0.1	0.05	0.00	0.01	0.05	0.00	0.0455	0.05	10,000	500
		Palm oil	chopped		10	87.00	0.10	9.80	0.00	0.00	4.55	5	14,500	72,500
	Clear soup : Spinach with carrot	Spinach	chopped	1. Cut spinach, peel carrot and cut into round shape 2. Chop garlic, shallot, tomato and red chili 3. Boil water and add garlic, shallot, tomato and red chili until cooked. Add carrot, boil for 10 minutes, then add spinach and boil for 5 minutes 4. Add salt, pepper and sugar	50	15.00	0.65	2.90	119.50	2.85	22.75	23	20,000	460,000
		Carrot	chopped		70	25.90	0.70	5.81	30.80	0.42	31.85	32	9,000	288,000
		Garlic	chopped		1	0.95	0.04	0.01	0.00	0.00	0.455	0.5	28,000	14,000
		Shallot	chopped		1	0.39	0.01	0.00	0.00	0.00	0.455	0.5	30,000	15,000
		Tomato	chopped		1	0.19	0.01	0.04	0.05	0.00	0.455	0.5	10,000	5,000
		Red chili	chopped		1	0.31	0.00	0.00	0.00	0.00	0.455	0.5	24,000	12,000
		Salt	chopped		0.5	0.00	0.00	0.00	0.00	0.00	0.2275	0.2	14,000	2,800
		Pepper	chopped		0.2	0.72	0.08	0.05	0.24	0.04	0.091	0.1	100,000	10,000
		Sugar	chopped		0.3	0.64	0.00	0.17	0.00	0.00	0.1365	0.1	14,000	1,400
				Total		**691.92**	**27.85**	**98.62**	**178.35**	**7.30**				**2,972,400**
				RDA		2300	70.5	316	1200	22.5				
				%RDA		30.1	39.5	31.2	14.9	32.4			cost/person	**6533**

Cooking instructions: Day 7

Supplier		Ingredient	Preparation method	Cooking guidance	Consumption amount (g/person)	Nutrient value (per person)					Order amount (kg)	Actual order amount (kg)	Unit price (IDR)	Total cost (IDR)
						Energy (kcal)	Protein (g)	Carbohydrate (g)	Calcium (mg)	Iron (mg)				
	Steamed Rice	Rice	steamed	Wash rice and steam	100	360.0	6.8	78.9	6.0	0.8	45.5	45.5	10,000	455,000
	Stir fried tempe with soysauce	Tempe	steamed	1. Chop tempe into squares	50	74.5	9.2	6.4	64.5	5.0	22.8	23	20,000	460,000
		Garlic	chopped	2. Chop Garlic, onion and green chilli	1	1.0	0.0	0.2	0.4	0.0	0.5	0.5	28,000	14,000
		Onion	chopped	3.Saute garlic, onion and green chili until fragrant	1	0.4	0.0	0.0	0.4	0.0	0.5	0.5	30,000	15,000
		Green chili	chopped	4.Add tempe and mix it	1	1.0	0.0	0.2	0.5	0.0	0.5	0.5	24,000	12,000
		Salt	chopped	5. Add soy sauce, oyster sauce, salt and pepper	0.5	0.0	0.0	0.0	0.1	0.0	0.2	0.2	14,000	2,800
		Pepper		6. Cook all until done	0.2	0.7	0.1	0.1	0.2	0.0	0.1	0.1	100,000	10,000
		Soysauce			0.5	0.2	0.0	0.0	0.6	0.0	0.2	0.2	30,000	6,000
		Oyster sauce			0.2	0.1	0.0	0.0	0.2	0.0	0.1	0.1	300,000	30,000
		Palm oil			1	8.7	0.0	1.0	0.0	0.0	0.9	1	14,500	14,500
	Clear vegetable soup	Carrot		1. Peel carrot and cut into rounds, cut green beans into 2 cm pieces, chop cabbage and corn	50	14.0	0.4	3.2	23.0	0.3	22.8	23	9,000	207,000
		Green bean	chopped	2. Puree garlic and shallot	50	15.0	1.1	3.2	53.5	0.3	22.8	23	15,000	345,000
		Cabbage	chopped	3. Chop leek and celery	25	4.5	0.3	1.0	8.6	0.1	11.4	11.5	9,000	103,500
		Corn	chopped	4. Saute the spices, add water and boil	25	32.3	1.0	7.6	1.3	0.3	11.4	11.5	14,000	161,000
		Garlic	chopped	5. Add carrot and corn and boil	1	1.0	0.0	0.0	0.0	0.0	0.5	0.5	28,000	14,000
		Shallot	pureed	6. Add green bean and cabbage and boil	1	0.4	0.0	0.0	0.0	0.0	0.5	0.5	30,000	15,000
		Leek	pureed	7. Add salt, pepper, leek and celery and boil until done	1	0.3	0.0	0.1	0.6	0.1	0.5	0.5	22,000	11,000
		Celery	chopped		0.5	0.1	0.0	0.0	0.3	0.0	0.2	0.2	30,000	6,000
		Salt	chopped		0.5	0.0	0.0	0.0	0.1	0.0	0.2	0.2	14,000	2,800
		Pepper			0.2	0.7	0.1	0.1	0.2	0.0	0.1	0.1	100,000	10,000
		Palm oil			2	18.0	0.0	0.0	0.0	0.0	0.9	1	14,500	14,500
					Total	**532.85**	**19.08**	**101.83**	**160.44**	**6.96**				**1,909,100**
				RDA		2300	70.5	316	1200	22.5				
				%RDA		23.2	27.1	32.2	13.4	30.9			cost/person	**4,196**

Ultimately, the information above was used to create a 30-day menu in the Indonesia training.

4.6.5. Step 5 - Create menus for different purposes based on dish card information

Understanding of the menu deployment process up to Step 4 makes it possible to select dishes and consider combinations to suit specific aims, such as creating an expensive menu, a cheap menu, a complicated menu (meals with many preparation procedures), or a menu rich in calcium. In this way, menus can be created with various combinations of aspects, including costs, ingredients (nutritional value), cooking methods, and dishes. This also illustrates to users that it is possible to create menus tailored to address specific health issues while still monitoring and confirming aspects such as nutritional value.

		Energy (kcal)	Protein (g)	Carbohydrate (g)	Calcium (mg)	Iron (mg)	Cost (IDR)	Number of processes
Expensive menu								
Staple food	Rice	356.0	4.2	81.2	10.0	1.0	1,000.0	1
Protein source	Fried chicken with galangal	229.3	28.2		11.0	3.0	3,757.0	4
Vegetable source	Clear vegetable soup	51.5	1.7		85.1	0.6	1,956.0	7
Total		636.8	34.1	81.2	106.1	4.6	6,713.0	12
%RDA		29.9	46.4	26.5	2.2	18.2		
Cheap menu								
Staple food	Rice	356.0	4.2	81.2	10.0	1.0	1,000.0	1
Protein source	Bakwan oncom	228.9	6.2	35.5	26.1	5.9	526.6	4
Vegetable source	Sayur asam	17.3	0.7	3.6	14.2	0.2	953.8	4
Total		602.1	11.1	120.3	50.3	7.1	2,480.4	9
%RDA		26.3	15.8	38.3	4.2	31.3		
Complicated menu								
Staple food	Rice	356.0	4.2	81.2	10.0	1.0	1,000.0	1
Protein source	Stir fried tempe with soy sauce	83.8	9.2		65.4	5.0	1,240.0	6
Vegetable source	Clear vegetable soup	51.5	1.7		85.1	0.6	1,956.0	7
Total		491.3	15.1	81.2	160.5	6.6	4,196.0	14
%RDA		21.5	21.5	25.9	13.4	29.0		
Calcium-rich menu								
Staple food	Rice	356.0	4.2	81.2	10.0	1.0	1,000.0	1
Protein source	Tongkol balado	120.7	3.6	15.8	1536.0	0.5	1,460.4	4
Vegetable source	Moringa soup	122.0	4.1	14.7	184.2	0.7	1,678.8	3
Total		598.7	11.9	111.7	1730.1	2.2	4,139.2	8
%RDA		26.2	16.9	35.6	144.2			

4.7. Nutrition education

Corresponds to Figure 1 (6). Check how nutrition is taught in the local area. If there is insufficient experience with local nutrition education, teaching materials used in Japan can be used to provide specific images and examples.

Indonesia training example

At present, nutrition education is virtually non-existent in Indonesia. Thus, in the training we introduced actual nutrition education materials used for school lunches in Japan. Because the staple food in Indonesia is rice, the three-color food groups used in Japanese schools can also be used in Indonesia. As part of the explanation on the Japanese teaching materials, we used the teaching apron, which was a big hit (see photograph below).

Actual deployment of nutrition education will come later in Indonesia, but the participants of this training were young university lecturers, who thus see a variety of materials for nutrition education. They seemed very excited by a lecture on how to use the teaching materials, and it was inspiring to see their excitement about being able to use the teaching materials after rearranging the content to suit their needs.

4.8. Material management

Corresponds to Figure 1 (7). Confirm local material procurement methods. Check whether it is possible to procure materials based on a contract with farmers or wholesale traders. Once procurement methods have been determined, confirm and estimate purchasing, check inventory, and place orders.

4.9. Production management

Corresponds to Figure 1 (8). Hold a meeting with local chefs about cooking procedures and work. Confirm the work schedule.

4.10. Hygiene management

Because current hygiene management may be inadequate, check the following hygiene-related aspects:

Personal hygiene

- Is chefs' health status checked routinely (annually) and on the day of cooking (general physical condition, presence of diarrhea/vomiting/fever)? Are chefs' nails kept short?
- Do chefs wear clean, dedicated uniforms (or aprons)? Do they wear masks and hats to cover their hair?
- Do chefs wash their hands before starting work and when changing tasks during cooking?

Food hygiene

- Are foods with different hygiene requirements separated during storage, cooking, and storage of cooked food (e.g., raw fish and meat are not stored with food eaten raw, such as fruit and vegetables, etc.)?
- Are prepared dishes served in a different location than is used to process fish and meat before cooking?
- Are measures in place to ensure fresh animal-based produce, such as fish, meat, and eggs, are not left at room

temperature for long periods of time during cooking?

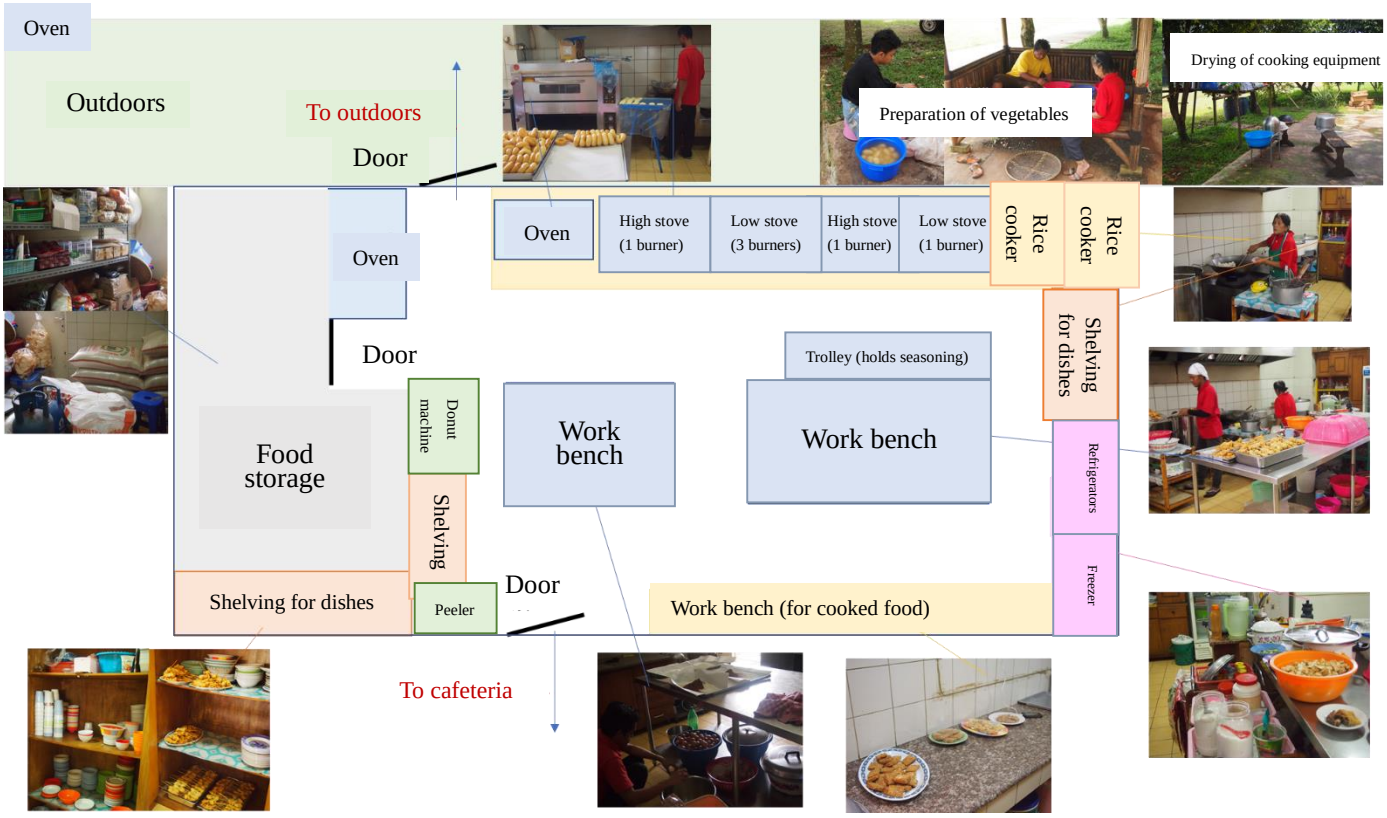
- Is food contaminated with dirt washed thoroughly?
- Are cooking times adjusted to ensure that prepared dishes are served and eaten promptly, rather than left sitting for long periods of time?
- Are cooked dishes stored such that insects have no access to the food?

Facility/equipment hygiene

- Are cooking utensils and equipment arranged and organized so that clean items can be used?
- Is the kitchen floor free of garbage?
- Is cooking performed or is food left in places where water may splash up from the floor?

Indonesia training example

Private elementary school kitchen



We visited a local private elementary school serving the most advanced school lunches. The school kitchen was laid out as shown above. Although work was implemented efficiently, some hygiene management items (see section 4.10) required improvement (marked with × or △, indicating that items are completely unfulfilled or partially fulfilled, respectively; the symbol ○ indicates that the item is completely fulfilled).

Personal hygiene

- *Is chefs' health status checked routinely (annually) and on the day of cooking (general physical condition, presence of diarrhea/vomiting/fever)? Are chefs' nails kept short?* ⇒ ×
- *Do chefs wear clean, dedicated uniforms (or aprons)? Do they wear masks and hats to cover their hair?* ⇒ ×
- *Do chefs wash their hands before starting work and when they change tasks during cooking?* ⇒ △ *(Only before starting work.)*

Food hygiene

- *Are foods with different hygiene requirements kept separate during storage, cooking, and storage of cooked food (e.g., raw fish and meat are not stored with foods eaten raw such as fruit and vegetables, etc.)? ⇒ △ (Prepared dishes are placed on a separate shelf, but the chefs do not appear to consider hygiene.)*
- *Are prepared dishes served in a different location than is used to process fish and meat before cooking? ⇒ × (Processing of raw fish/meat and serving of prepared food are performed in the same location. In this case, it is necessary to devise countermeasures, such as serving prepared dishes on a work bench not used for processing fish and meat. If that is not possible, then measures are needed to keep the work bench clean, such as thoroughly wiping it down after processing fish and meat.)*
- *Are measures in place to ensure that fresh animal-based produce, such as fish, meat, and eggs, are not left at room temperature for long periods of time during cooking? ⇒ △ (Meat is stored in the refrigerator, but eggs are kept at room temperature.)*
- *Is food contaminated with dirt washed thoroughly? ⇒ ○ (Food is washed outside, but washing is thorough.)*
- *Are cooking times adjusted to ensure that prepared dishes are served and eaten promptly, rather than being left sitting for long periods of time? ⇒ ○ (Cooking times appear to be adjusted properly.)*
- *Are cooked dishes stored such that insects do not have access to the food? ⇒ × (Prepared dishes are stored on a work bench with the kitchen's exterior door left open.)*

Facility/equipment hygiene

- *Are cooking utensils and equipment arranged and tidied to ensure clean items can be used? ⇒ ○ (Items and equipment appear to be arranged suitably.)*
- *Is the kitchen floor free of garbage? ⇒ × (Garbage is left on the floor.)*
- *Is food cooked or left in places where water may splash up from the floor? ⇒ × (Food is stored at a low height, so there is concern regarding contamination from water splashing up from the floor.)*

As shown in the layout diagram, the workplace has no water facilities, meaning there is no way to support handwashing during work or wiping work areas clean. Securing water required for cooking is also essential. In this context, it is necessary to consider the optimal facilities to suit local circumstances. If water and sewage facilities are located outside, it is essential to consider the layout of facilities in the kitchen, considering the lines of flow for people and food.


Above: Dormitory kitchen where intervention was implemented (left: kitchen exterior; right: kitchen interior).

The kitchen contained three cooking stoves, with only a pot for cooking rice and a large pot placed on the stoves. Rice was washed outside, using water from a hose brought into the passageway at the side of the kitchen. Vegetables and other ingredients were prepared by placing a cutting board in the kitchen as needed.

4.11. Ascertaining eating (intake) status

Corresponds to Figure 1 (9). Confirm eating status (how children eat, ease of eating), serving amount and amount of remaining food (leftovers), and any incidents of food poisoning, allergy symptoms, etc.

4.12. Comprehensive assessment

Corresponds to Figure 1 (10). If possible, assess the results from the perspective of both the children and the parents (using a questionnaire, etc.).

5. Anticipated results of the manual, issues, and associated countermeasures

The following results were achieved in the Indonesia training, implemented in accordance with the above manual. However, a number of issues remained, countermeasures for which are proposed below.

5.1. Results

In Indonesia, the concept and implementation of food service is limited to only certain hospitals. However, presenting detailed information on Japan's food service system provided participants of the Indonesia training with specific examples for each of the processes required to serve school lunches. Concrete results were as follows:

- Participants came to understand the concept of main and side dishes and the methods for creating variety in main and side dishes.
- Participants gained insight into the concept of creating varied menus by combining main and side dishes, and were able to apply the concepts in practice.
- Participants came to understand cost management for the material costs of each meal component, and by combining the individual costs, they were also able to grasp the cost of a single meal, a day's worth of meals,

and a week's worth of meals.

5.2. Issues and countermeasures

In a number of instances, the amount of ingredients per person was found to be inappropriate, particularly the amount of seasonings and the whole dish amount per person (constituent amount of ingredients). Whether because of weaknesses in menu creation or cookery/cooking practice in nutrition education in Indonesia, or because seasoning is not included in the calculation of nutrition in Indonesia, little regard for seasonings (oil, salt, etc.) was shown. Countermeasures are needed to address this, as understanding and awareness of appropriate seasoning amounts is essential to progress to the next step and deploy menus considering and accommodating various health issues.

5.3. Example results

The menu created in the Indonesia training was used to serve meals to 400-500 junior high school students living in dormitories. A 30-day menu was created during the training itself, but this was modified into a 14-day cycle menu based on the onsite operations. It will be important to consider what necessitated the reduction to a 14-day menu (lack of specific resources, etc.) when designing the next menu.

Implementation of the thinking methods learned through skill-up training

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