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FOOD FORTIFICATION

A REVIEW ON THE PROBLEMS AND THE POSSIBILITY OF
FORTIFICATION TO IMPROVE NUTRITION IN INDONESIA

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(Paper submitted by the Government of Indonesia)

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1 INTRODUCTION

Indonesia, as many other developing countries, is facing four main malnutrition problems which affect very seriously the state of health of its population, namely:

- (1) Protein calorie malnutrition (PCM);
- (2) Vitamin A deficiency (xerophthalmia);
- (3) Iodine deficiency (endemic goitre and cretinism), and
- (4) Nutritional anaemia.

Malnutrition has a complex etiology and is the result of a combination of many factors, foremost of which are: inadequate production and inadequate availability of foods, especially nutritionally valuable foods, to a large proportion of the population, and insufficient understanding of nutritional requirements.

The Government of Indonesia has become increasingly concerned about the prevalence of malnutrition among its population and has committed itself to improving this situation. This commitment is reflected by its intention to develop and implement a comprehensive national nutrition programme.

Since 1950, many efforts have been made by the Government in order to improve the nutritional status of the people. Initially, laboratory research was conducted, followed by educational efforts and, recently, many nutrition intervention activities have been carried out. The Second Five-Year Development Plan (Repelita II 1974-1979) has the following objectives (regarding food and nutrition, Chapter 11):

- (1) Stabilizing food prices at a level which is within the buying capability of the people but still ensures adequate income to the farmer;
- (2) Improving the nutritional value of food, and
- (3) Diversification of food consumption.

On 13 September 1974, the President of the Republic of Indonesia issued a Decree known as the "Presidential Instruction No. 14/1974" concerning the improvement of people's menu.

In 1975, a Technical Commission for the Improvement of People's Menu was established by the Decree of the State Minister for People's Welfare in his capacity as the Coordinator of the implementation of Presidential Instruction No. 14/1974. This Technical Committee has identified the following short-term nutrition programmes that have to be implemented immediately:

- (1) Nutrition education;

- (2) Food fortification (in this respect, fortification of wheat flour);
- (3) Prevention of endemic goitre through the use of iodized salt;
- (4) Family nutrition improvement programme, and
- (5) Promotion of breast-feeding.

The above-mentioned clearly showed the seriousness of the Government in making efforts to improve the nutritional value of the people's menu, especially through food fortification.

2 FOOD FORTIFICATION

Fortification is a term which is used by the Joint FAO/WHO Expert Committee and is considered as the right terminology to illustrate the addition of nutrients to different foodstuffs in order to improve or maintain the quality of food consumed by a community. Many terminologies are being used in different countries, e.g., nutrification, enrichment or supplementation. Fortification seems to be the most appropriate word as it describes the process whereby nutrients are added to foods to maintain or improve the quality of the diet of a group, a community or a population.

Food fortification is a public health measure for improving the nutritional status of the community through an adequate supply of nutrients in their menu. The main thrust could be directed at the vulnerable groups in the community by selecting those food items that are widely consumed, e.g., foodstuffs for the school-feeding programme or for the under-fives in kindergartens. Usually, food fortification has the following three objectives:

- (1) To replace those nutrients that were lost during processing;
- (2) To improve the nutritional value of certain food items, and
- (3) To improve the quality of the foodstuff that is widely used in the community.

With the advancement of technology, food fortification has shown tremendous improvements. The practice of fortification started after the discovery of some vitamins in the years 1930-1940. At that time fortification was primarily directed towards staple foods (cereals) relevant to the nutrition problems encountered (vit. B, iodine, vit. B1 deficiencies). Philippines succeeded in 1940 in eradicating beriberi through thiamine fortification, while in 1960 Taiwan implemented a riboflavin fortification programme. In the USA a programme of niacin fortification was implemented to combat pellagra in the years 1930-1940.

In Indonesia, it is high time to consider a national and well-directed food fortification programme. Some activities on fortification had been done; however, they were not seriously taken up by the Government, for instance, the production of multi-purpose food in 1958, of pre-mix rice and other mixture of food for the under-fives. Fortification of wheat flour could not be implemented yet, because the new standard for wheat flour industry has not yet been established by law by the Department of Industry. Fortification of some foodstuffs was done more on a voluntary basis by several industries without any control or direction from the Government; e.g., fortification of margarine with vitamin A, and some vitamins in certain kinds of bread. Uptil now, salt is the only item that is being fortified with 40 ppm of potassium iodate.

3 PROBLEMS ENCOUNTERED IN FOOD FORTIFICATION

The following points should be taken into consideration if a comprehensive national food fortification programme is desired as an effort to combat malnutrition:

- (1) Standard nutritional requirements for the average Indonesian. At present, the recommended dietary allowances (RDA) for Indonesia is still based on results of NAS-LIPI Workshop of Food, held in 1968 which do not cover all nutrients required by the human being. There are approximately thirty nutrients known; however, the RDA for Indonesia is limited to only eleven nutrients. On the other hand, the actual food consumption and its pattern should also be known. This is very important to determine the dosage and kind of nutrient to be added so that an effective programme could be safely implemented without side effects. A menu chart for different regions is considered necessary.
- (2) In general, fortification of foodstuffs is limited to only a few types. However, the consumption of fortified foodstuffs might decrease the use of other foodstuffs, which means a saving of certain nutrients. Therefore, the balance of the consumption of fortified food and the possible decrease in the consumption of other foodstuffs should be the basis for fortification.
- (3) Experiences in some countries indicated that food fortification without serious control could result in an imbalance of the menu which could harm the community health. This will confuse the community.
- (4) With regard to fortification itself, the following should be considered:
 - (a) acceptability,
 - (b) buying capability,
 - (c) change of colour, taste, smell, and
 - (d) cooking process.

- (5) Very often the different standards of fortification in different countries hinder trade promotion. Therefore, a control system and mechanism should be set up.

4 THE POSSIBILITY OF FOOD FORTIFICATION IN INDONESIA

The following types of food could be considered for fortification in the context of the Food Fortification Programme in Indonesia:

Nutrients	Types of food	Comments
<u>Vitamin A</u> (in a mixture thiamin, riboflavin, niacin, iron and calcium)	- Wheat flour	Is awaiting implementation
	- MSG (Mono sodium glutamate)	Needs further research
	- Sugar	Needs further research. Panama experience.
<u>Iodine</u>	- Salt	Is being implemented using 40 ppm potassium iodate.
<u>Iron</u>	- Wheat flour	Is awaiting implementation.
	- Salt	Needs further research.
<u>Amino Acid</u> (lysine and a mixture of thiamin, riboflavin, niacin, iron and vitamin A)	- Rice	Needs further research.

In addition to the above comments, further research and preparation are needed such as research on:

- (1) the technological aspects of fortification, and
- (2) the administrative aspects, including price control, marketing/distribution system, monitoring, etc.

An inter-departmental team should be established at the national level to be responsible for the planning, programming as well as implementation of the National Food Fortification Programme.

SOME TYPES OF FOOD USED AS VEHICLES IN FORTIFICATION
PROGRAMMES

Nutrients	Type of food	Comments
Ascorbic acid	Canned, frozen and dried fruit drinks, canned and dried milk products, dry cereal products.	Must be protected from air if in neutral solution.
Thiamin, riboflavin, niacin	Dry cereals, flour, bread, pasta, milk products.	Rice and similar food grains may be impregnated or coated with the nutrient; riboflavin may colour the food; nicotinamide is usually preferred to nicotinic acid.
Vitamin A (or β -carotene)	Dry cereal products, flour, bread, pasta, milk products, margarine, vegetable oils, sugar.	Must be protected from air and added in water-miscible form to non-fatty products; carotene may colour the product; losses due to heat may be great in cooking oils.
Vitamin D	Milk products, margarine, dry cereal products, vegetable oils, fruit drinks.	See comments in respect of vitamin A; multiple sources of this vitamin may be undesirable.
Calcium	Cereal products, bread.	The quantity to be added usually limits the range of vehicles that can be used.
Iron	Cereal products, bread, canned and dried milk.	Availability varies with the form in which the iron is added; iron may cause colour or flavour changes in the food.
Iodine	Salt.	Iodine usually used; iodate more stable in crude salt.
Proteins	Cereal products, bread, cassava flour.	Protein concentrates of various types are used; the amount to be added usually limits the range of vehicles that can be employed.
Amino acids	Cereals, bread, meat substitutes.	Other vehicles have been proposed but not yet used; use of lysine, cysteine, or methionine now authorized in some areas.

Source: *Joint FAO/WHO Expert Committee on Nutrition (1).*