Fortification of food with micronutrients:  
the role and position of FAO

Introduction

Governments, often assisted by international agencies and non-governmental organizations and industry, have for many decades taken steps to eliminate or reduce micronutrient deficiencies. Building on the impressive results of the reduction in iodine deficiency disorders (IDD) through the fortification of table salt with iodine, vigorous efforts are currently being made to similarly address other micronutrient deficiencies through the fortification of appropriate foods.

The technological problems to fortification, even in developing countries, are being overcome. Different foods may be fortified with a single micronutrient, for example the fortification of sugar with Vitamin A, or with more than one nutrient such as the double fortification of salt with iodine and iron, and the multi-micronutrient mixes added to wheatflour products. The international nutrition community is now looking at ways to apply fortification more prominently in order to reduce or eliminate other existing micronutrient deficiencies.

This paper outlines the role and position of FAO for the fortification of foods with micronutrients and how FAO can provide technical assistance to governments, in concert with international agencies, non-governmental organisations, public and private institutions and the food industry, to support planned and ongoing fortification programmes. However in providing such assistance we must recognise that fortification programmes have certain limitations, and that to ensure their success and sustainability, such programmes should be implemented in concert with poverty reduction programmes and a number of agricultural, health, education and social intervention programmes that promote amongst the nutritionally vulnerable the consumption and utilization of adequate quantities of good quality nutritious foods.

The term food fortification means the addition of nutrients at levels higher than those found in the original food. Fortification is synonymous with enrichment. Restoration is where nutrients are added to a food to compensate for the loss of nutrients during processing. Generally, food fortification is undertaken at the industrial level although food fortification can also take place at the household or community level.

Mass fortification refers to the addition of micronutrients to foods consumed commonly by the general public, such as cereals and condiments, instigated, mandated and regulated by the government sector. Universal fortification refers to the fortification of foods consumed by animals as well as humans, with iodization of salt being the main example. Targeted fortification programmes also exist for example, the distribution of biscuits fortified with a number of vitamins and nutrients in school feeding programmes. Furthermore, in some countries fortification of some foods (e.g. wheat flour) with specific nutrients at specific levels may be mandatory as legislated through government.
**FAO’s overall policy to improve nutrition**

FAO’s efforts to improve nutrition worldwide are guided by the recommendations made during international meetings and conferences including the International Conference on Nutrition and the World Food Summit. To achieve these, emphasis is being given to address the underlying causes of malnutrition and the micronutrient deficiencies that often accompany it, which rest, inter alia, in poverty, the underdevelopment of agriculture and unsustainable livelihoods that can lead to food insecurity at national and household level. Actions that promote an increase in the supply, access and consumption of an adequate quantity, quality and variety of foods for all populations groups is central to FAO’s work. It is also the logical outcome of the overall right to food, the internationally agreed right for all humans. Based on these rights FAO promotes and supports sustainable food-based programmes and strategies to improve nutrition with the aim that all people can obtain through a variety of different foods a diet providing all energy, macro and micronutrients in order to achieve a healthy and productive life.

Fortification of food with micronutrients has been identified by the above Conferences as a valid technology for adoption as part of a food-based approach when and where existing food supplies and limited access fail to provide adequate levels of the respective nutrients in the diet. In such cases, fortification of food is seen as a valuable addition to reinforce ongoing nutrition improvement programmes. In FAO’s view fortification is not an alternative to the overall goal of improving nutrition through making policy and programming responses that encourage the consumption of a nutritionally adequate diet made up from a variety of available foods.

In developing food fortification programmes attention must be paid to the following:

- The most affected population groups in need of improved nutrition are the poor. They often have restricted access to fortified foods due to low purchasing power and undeveloped distribution channels. The combination of low economic demand and lack of physical access to markets means that the poor and vulnerable, the principal target groups for fortified foods, often eat food directly from the field without the added value of commercial food processing.

- Poor population groups are known to have multiple micronutrient deficiencies which realistically cannot all be addressed by fortified foods. As most traditional diets are normally able to provide the micronutrients required for normal function and growth, micronutrient deficiencies generally result from inadequate intakes of the overall diet.

- The technology of fortification of different foods remains still not fully resolved as regards levels of nutrients, stability, characteristics of physical properties as well as acceptability by consumers including cooking properties and taste.

- Insufficient scientific knowledge regarding nutrient interaction complicates the decision as to how much of a nutrient is to be added to a food.

Nevertheless, fortified foods as part of food aid are of unquestionable value to protect the nutritional status of vulnerable groups and victims of emergencies.
In this context FAO is pursuing the goals set by governments for overall nutrition improvement through food-based approaches as priority and is assisting countries in ensuring that food fortification programmes find their appropriate place as one element of national nutrition improvement policies, plans and programmes.

**Contributions of FAO to food fortification**

Governments can request specific technical assistance from FAO for food fortification. This may include assistance to governments in planning and operational management skills necessary to start or expand a food fortification programme to improve micronutrient malnutrition. In addition there are a number of elements from different sectors which require technical assistance and FAO supports and strengthens fortification programmes in the following such areas.

1. **Planning and operational management**

FAO assists governments to set criteria and identify desirable prerequisites from different technical fields to help decide whether to set up or expand a food fortification programme. The setting of such criteria are considered essential to ensure success and sustainability of programmes as they reflect past programme results and experiences. Criteria include:

**Programme coverage:** The actual and expected beneficiaries of the fortification programme need to be identified and their nutritional needs as well as dietary practices analysed. Such analysis may identify population groups who although in need, may be excluded from a programme e.g. the universal fortification of a staple (wheat), if they were found to be not purchasing the staple. The outreach of a programme and accessibility of beneficiaries will determine what measures other than food fortification are required to assist such target population groups. Estimates of population sizes will also assist in the assessment of costs. This will call for a comprehensive data set on the prevalence of deficiencies, food consumption including the intake of micronutrients, and food habits and attitudes of vulnerable groups, including socio-economic data.

**Cost issues: start-up cost, purchasing power product price, follow-up costs:** Although the technical problems to fortify a food with a specific micronutrient can be overcome, this may take years of trials to adjust for micronutrient levels or physical qualities and taste, all of which have a considerable cost. Even when the technical difficulties have been overcome, fortification programmes are not cost-free. The costs associated with the food fortification process can limit the implementation and effectiveness of food fortification programmes. Careful analysis of these issues prior to taking any decision to launch or expand a programme is needed. While start-up costs are often available to governments from external sources, for example donors, foundations and industry, this can seriously distort the realistic analysis of the purchasing power of the expected beneficiaries as well as the recurrent costs involved in creating and maintaining the demand for these products. While various schemes (government subsidy, shifting costs to better-off social groups, etc.) have been tried in fortification programmes, when not demand-driven, these tend to be unsustainable. Realistic government decisions on these issues must be based on the analysis of recurrent follow-up programme costs.


Requirements for food legislation, food control and quality assurance: The food industry and manufacturers of foods operate within legal restrictions and regulations set by government as guided by national and international technical bodies. Their interest and effective participation in fortification requires the establishment of widespread legislation including the standards for fortification in food product development, manufacturing and distribution and consumer protection. Only such legally bound standards allow for effective food control and quality assurance later on. The standards include regulations for claims and labelling often considered advantageous for creating consumer demand for fortified products.

Collaboration and coordination among governments, public scientific and civic institutions, manufacturers and consumer groups: The planning and implementation of a food fortification programme is a complex matter. It requires participation and inputs throughout the process from various technical, industrial and civic groups and ultimately the consumers, all to be harmonised and coordinated by government and programme staff. External assistance agencies are part of this process but a balance needs to be struck between their drive and use of external resources for fortification programmes and the reality and conditions existing in different programme countries. To ensure the sustainability of food fortification programmes, a ‘country-driven’ rather ‘agency-driven’ focus must be given priority.

Support programmes: Food fortification programmes are ultimately directed to the consumers. The various population groups with their different social, economic, sometimes religious and cultural attitudes and practices call for tailoring programme understanding, acceptance and implementation accordingly. Social marketing and information campaigns are commonly part of food fortification programmes, but are by themselves not sufficient. The programme needs to be closely linked with a nutrition education programme for the public. Past experiences have shown clearly that failure or inefficiencies of fortification programmes were due to the failure to address public concerns and to gain the widest public involvement.

2. Specific technical assistance elements

While recognising these limitations and concerns, FAO assists governments in their efforts to eliminate or reduce micronutrient malnutrition through food fortification programmes adopted as part of a comprehensive food-based strategy by:

- Providing technical assistance to set up new or review existing food laws and strengthen the legal aspects of fortification and related food control.

- Strengthening existing food control structures including human resources, inspection services and laboratories for product quality assurance as well as in collecting and analysing reliable data for monitoring and evaluation purposes.

- Making available technical manuals and guidelines including relevant publications of the Codex Alimentarius so that effective training can be undertaken; technical discussions on food claims, labelling and packaging are facilitated taking into account international food standards.

- Facilitating collaboration of relevant industry groups, national or regional laboratories, international networks of specialists in the different technical fields required for food
fortification with government and programme staff.

- Supporting groups and laboratories, developing, updating and maintaining a food composition data base as essential background for determining needs for and levels of fortification including monitoring.

- Assisting in dietary assessment in population groups, including provision of software for the analysis of dietary intake data from comprehensive or rapid surveys and the setting up of surveillance systems for this purpose. This information provides the basis for food labelling requirements, including product claims made by government and manufacturers.

- Provision of printed and electronic technical manuals and guidelines on national food composition, and on nutrient requirements of different population groups and countries.

- Technical assistance to nutrition education programmes for the public so as to strengthen the impact of micronutrient fortification programmes thereby promoting sustainability.

- Strengthening participatory planning and implementation of relevant aspects of food fortification programmes through facilitating appropriate linkage with ongoing programmes on household food security and overall nutrition improvement including special programmes on emergencies, those directed towards HIV affected population groups and programmes with a gender component.

In addition to the above, FAO collaborates with international and national agencies and participates in relevant meetings at national, regional and international level on specific topics so as to accelerate the planning and implementation of comprehensive and sustainable food fortification programmes. This includes our collaboration with WHO in the preparation of guidelines on food fortification for governments and agencies currently implementing or considering implementing food fortification programmes. The FAO/WHO guidelines will provide information on the implementation, monitoring, evaluation and regulation of food fortification programmes intended to improve the micronutrient status of populations, particularly in developing countries. The guidelines will also be a source of information for scientists, technologists and the food industry.