

An information note prepared by The Micronutrient Initiative



FORTIFICATION OF FOODS FOR REFUGEE FEEDING: An idea whose time has come?

Introduction

Over the past decade, the fortification of foods destined for refugee feeding has been urged by many experts involved in emergency assistance (FAO/WHO 1992; Combs, G.F. et al 1994; Henry, CJK 1995; Refugee Policy Group 1995). Yet, little has been done in a systematic way to test the feasibility of this approach as a way to provide adequate micronutrients in the refugee diet.

In a newly released report commissioned by the Canadian International Development Agency (CIDA) on the fortification of foods for refugee feeding¹, yet another eminent voice has been raised that calls for those concerned about the micronutrient inadequacy of refugee rations to seriously consider the fortification of refugee rations—specifically, grain-based commodities—as a method to improve the micronutrient intake of refugees.

The Micronutrient Initiative (MI), with a grant from CIDA, has taken up this challenge, and in 1996 will direct resources to implement some of the research recommendations made in the report. The MI urges others to do the same, and would welcome working with interested partners.



The micronutrient content of the diet of refugees is often inadequate. Is it feasible and appropriate to improve the micronutrient content of diet through fortification?

¹ Beaton, G.H. 1995. *Fortification of foods for refugee feeding*. Final report to the Canadian International Development Agency, CIDA, Ottawa. Single copies available free of charge from Dr. Sonya Rabeneck, Senior Nutritionist, CIDA, Multilateral Branch, 200 Promenade du Portage, Hull, Quebec, Canada K1A 0G4. Tel: 819 994-3904; Fax: 819 953- 5348; e-mail: sonya_rabeneck@ccigate.acdi-cida.gc

Improving the micronutrient content of foods for refugees: How can it be done?

In the CIDA report "Fortification of foods for refugee feeding" the author, Dr. George Beaton, Professor Emeritus of the University of Toronto, ponders the question of what action CIDA and other bilateral agencies, working with World Food Program (WFP) and United Nations High Commission for Refugees (UNHCR) might take to improve the micronutrient supply of the general food ration offered to refugee populations in Africa during the early phase when they are totally dependent on donated food. Should CIDA (and other donors), as requested by WFP in 1995, ship blended foods as a method of addressing micronutrient inadequacies of the refugee food ration? If yes, what is the suitable composition for such blends? If no, what alternative actions could Canada take to meet the intent of the WFP request?

In the early part of his report Dr. Beaton addresses the nature of Canada's food aid commitment, the nutrition situation of refugees, and the overall setting of refugee feeding, as a background to later discussions and recommendations. Next he proceeds to establish a guideline for a reference nutrient density profile, adequate to meet the functional needs of refugees, assuming that a minimal target energy intake of 1900 kcal is met. He proceeds then to examine the likely nutrient profile of the commonly supplied basic food rations (using WFP guidelines as a basis for determining the content of the basket) and compares this to the reference nutrient density guidelines. With this information, an estimation of the nutrient gap for each of the wheat-based, maize-based and sorghum-based basic rations is made.

The author wrestles with the question "*Given that there is an apparent shortfall in nutrient supplies in the basic refugee ration, how can the needed additional nutrients be made available to refugees?*" Dr. Beaton notes that, regrettably, observations from past experience seem to all but eliminate the most desirable approach to the problem: a major change in the nature and range of foods supplied to refugee populations, or the provision of foods in a way that encourages local barter for preferred foods and for diversification of the diet. Such actions, particularly the latter, become more feasible in the longer term. However, in many if not most refugee situations, there is total dependency on the distributed foods in the early stages

and with it, a very high risk of nutritional inadequacies of the diet—inadequacies that set the stage for later clinical problems (high morbidity and mortality rates; and in some situations, appearance of acute deficiency syndromes). Direct distribution of pharmaceutical sources has also not been effective, with both coverage and compliance posing major problems. The main hope then, practically speaking, rests in improving the rations that are distributed to refugees. And the way to do this, Dr. Beaton suggests, is through fortification.

The paper identifies the nutrients that should be added to the general diet if the needs of all classes of subjects (except iron and folate for pregnant women) are to be met. It then proposes a specific fortification premix that could be used for all three staple cereal rations. The report suggests that this nutrient premix might be added to the cereal portion of the ration at a central processing site, immediately prior to distribution at a decentralized milling site, or after distribution at the level of village mills to which households bring their grain ration (mills provided, by policy, by WFP where possible). As a last resort, the nutrient premix could also be used in the form of a heavily fortified cereal that he terms "household level fortification mix" which would be added to the cereal during hand milling or added to the food during cooking. This mix would be designed to complement the basic ration offered to refugees, providing nutrients otherwise in short supply.

The report also offers comparisons between fortification and the current policy regarding the use of blended foods, in terms of likely coverage of all classes of individuals (rather than target individuals), likely adequacy and safety of nutrient intakes (using a mock fortification of diets seen in a Kenyan community), and estimated cost comparisons of fortification versus supply and use of greatly increased amounts of blended foods. In these comparisons, Beaton makes the following important points:

- Existing blended foods were originally designed for use in supplementary feeding to be consumed in recommended amounts by defined target individuals. Blended foods were not originally intended to be used as vehicles for the complementation or fortification of the general diet.

- If it is decided to continue to use existing blended foods, with existing formulations, as a basic commodity in the general ration to provide missing micronutrients, then it appears that at least 25% of the total cereal ration would have to be in the form of blended food—and even then, some important micronutrient needs would not be met.

The report implies—but does not recommend—that if blended foods are to be used as the vehicle for supplying micronutrients they should be reformulated with *that* specific purpose in mind. If such a reformulation was made, the composition and preferred mode of usage would likely be very close to that suggested for the household level fortification mix.



UNHCR/Giovanni DiIacinti

Can fortification help to reduce their risks of malnutrition and lead to improved health and wellbeing?

A call to action: Fortification as a strategic approach

Key recommendations in the Beaton report:

The process of elimination of “obvious” options (ie., supplementation, dietary diversification) led Dr. Beaton to conclude that fortification is needed to overcome the micronutrient inadequacy of the refugee diet in Africa in the early stages of refugee translocation. Cereal-based rations, being the major part of the refugees’ ration, may be the best vehicle for the provision of the necessary micronutrients. Some of the key research recommendations he makes relate to his fundamental point that *before fortification of cereal food aid can be seriously promoted for bilateral and multilateral cooperative effort, it is essential that there be further very practical exploration of its logistical feasibility, technical feasibility (equipment and nutrient stability), relative cost, and acceptability to both the final recipients and to those responsible for the management of the programmes.* Toward that purpose Dr. Beaton identified the need for field information, and sometimes technical research, in at least the following areas.

- Information on nutrient stability under expected local conditions of both processing and cooking of cereals so that, as appropriate, levels and possibly form of nutrients added, might be adjusted.
- Information on existing modes of the milling, household preparation and cooking of cereals, both to inform the research described above, and to consider the feasible points in the food supply, distribution and preparation chain at which fortification might be introduced. It is expected that at least WFP, UNHCR and the Food and Agriculture Organization (FAO) will have important information to contribute in terms of possible sites of fortification. Others may have critical information concerning existing household food preparation practices among refugees, particularly in the early stages of resettlement.

- Effecting large scale fortification of foods that are routed toward refugee feeding in Africa will require the development of milling and fortification capacity on the continent. It is hoped that it will be possible to look carefully at the potential beneficial impact of investing in regional fortification capacity (large scale milling) for both refugee feeding and longer term food industry and nutritional goals. Such exploration will also have to consider the development of associated quality control resources.

Opportunities for fortification of cereals:

If fortification is what is really needed to improve the nutrient supply for the general refugee population, then it must be recognized that there are a number of opportunities where fortification of cereals might be carried out. These opportunities are present at four different levels in the food supply, distribution and preparation chain, as summarized in the table below.

Dr. Beaton stresses that specific information (first from the field/refugee settings, and then from laboratory-based studies and field trials) would have to be available to determine if fortification is indeed a viable approach to alleviating the problem of the micronutrient inadequacy of refugee diets, and to make decisions that relate to the most appropriate level and method of fortification. It may be that (after following the recommended steps and collecting the required information) it is concluded that one—or more, or even all—of the possible sites of fortification are not viable and should be eliminated, or even that the fortification of cereals should not be espoused at all as a way to improve the refugee diet.

To obtain some of the needed information, Dr. Beaton suggests that research studies in actual refugee settings would need to be carried out. For other information needs it may be possible just to try to collect already existing information from UN agencies, technical associations, and other sources. The following provides more detail about some of the research and information needs. Some are particularly urgent; all will need to be pursued.

Point of fortification				
	Fortification before distribution		Fortification after distribution	
	National / Regional	At distribution point	By "village mills"	During household grinding or food preparation
Expected Advantages	Likely to be most efficient, and cost-effective. Likely to have greater long-term benefits to the country/region.	Very likely to be effective. Used soon enough that shelf-life not problematic.	Less likely to be effective (but likely to be better than present blended foods.) Recognizes the reality of the existing system.	Less likely to be effective (but likely to be better than present blended foods.) Recognizes the reality of the existing system.
Expected Disadvantages	The shortened shelf-life of milled cereal more likely to be a problem. Presents increased handling and shipping costs.	Increased difficulty of quality control (many facilities). Need equipment and training.	Requires substantial education component. Effectiveness depends on conscious action by individuals.	Requires substantial education component. Effectiveness depends on conscious action by individuals.

Each level has advantages and disadvantages. Constraints to implementation and estimated costs are expected to differ between sites of fortification.

Research questions and information needs

- **Study the actual preparation, and cooking methods used for cereals in refugee settings.** Key questions are: How are cereals actually prepared for consumption? If the cereal is milled before cooking, what sort of equipment is used? If cereals are boiled, baked or fried, what is the composition of the dish and what is the nature and duration of heat exposure? How do these practices differ across cultures? What are the practices relating to the distribution of food within the household? Findings will provide information about aspects of food preparation and cooking that impact on nutrient stability. The expected losses are critical to know when establishing the target addition of nutrients to be added in the fortification premix.
- **In situations where blended foods are being distributed as part of the general ration, study how the food is being used.** Key questions are: Is the blended food used as a separate food item or mixed into the main household dish? Do all household members share it or is it usually consumed by a particular age/sex group? These questions are important because they provide information critical to these two issues: 1) are fortified blended foods likely to effectively serve as a vehicle for the distribution of micronutrients to all household members or only to traditionally targeted classes of individuals? and 2) as a model of the potential use of a heavily fortified premix distributed to the household. The findings would have major relevance in preparing a final report and suggesting next steps.
- **Establish the cultural associations with not only the type of cereal (wheat, maize or sorghum) but also the preferred /acceptable final form of the processed cereal (ie., grits, meal or flour) and identify fortification technologies and strategies that are considered appropriate for different settings.** This information provides critical information that would have implications for the design and type of milling equipment and fortification technology.
- **In the household setting, study how foods are measured.** Knowledge of how common foods are measured is important background when making decisions about mixing ratios, unit volumes, etc., applicable to the design of either village level or household fortification.
- **Collect information about opportunities and capacity for milling in Africa.** Key questions include: Where and how can cereal milling be accomplished in the African setting? What experiences exist with small scale batch mills, capable of grinding cereal for single households, located in the community and accessible to households? Can batch milling operations be used as a site for fortification? What is the collective experience with intermediate scale milling in communities in Africa? What are the existing capacities for large scale milling of cereals in Africa? What is the feasibility of modifying commercially available equipment to permit fortification? What is the availability and types of mechanized milling equipment that WFP and UNHCR or others are now supplying for processing of cereal grains before or after distribution, and the potential for their use as a site of fortification with or without modification? What is the storage time and transport/environmental conditions for centrally-processed cereals. Information of this type is essential to understand just what the possibilities are for fortification, and define the point(s) at which fortification might be viable.

Following the gathering of information described above, there would need to be additional studies. There would be a need for controlled studies of mixing efficiency of various types of milling and mixing equipment. There would also be a need for controlled environment stability trials, and for an examination of nutrient losses during typical cooking procedures. Finally, other cooking properties of fortified cereals, and their palatability, would need to be tested.

Actions planned by the MI

The MI is committed to testing the feasibility of the Beaton recommendations vis-à-vis fortification of cereals.

The MI would like to work with others to support the initial studies that need to be done in refugee settings to gain information that has implications for the design and type of milling equipment and fortification technology, and the determination of levels of nutrients to be added to fortified cereals: for example, those studies that examine the actual preparation and cooking methods used for cereals, and the use of blended foods in situations where they are distributed as part of the general ration.

We invite your inputs:

The MI will be collecting information about opportunities and capacity for milling in Africa. As far as we know, there is little available information that is easily accessible. Do you have such information, or know where it is available?

For further information, or to offer ideas for this initiative on fortification of cereals destined for refugee feeding, please contact: the Micronutrient Initiative, 250 Albert Street, P.O. Box 8500, Ottawa, Ontario, Canada K1G 3H9.
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