

Agricultural research and nutrition

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This article is a positive contribution to the debate on nutrition and agricultural research, discussed in the preceding article by Robert Tripp.¹ The author believes that there are opportunities for enhancing the nutrition effects associated with a given investment in agricultural research. He outlines at least six ways in which the effects of agricultural research operate on nutrition, and calls for a closer analysis of the relationship between the six factors and nutrition and the impact of alternative research efforts on each of the six factors.

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¹Robert Tripp, 'Does nutrition have a place in agricultural research?', *Food Policy*, Vol 15, No 6, December 1990, pp 467-474.

²Per Pinstруп-Andersen, David Pelletier and Harold Alderman, Eds, *Beyond Child Survival: Enhancing Child Growth and Nutrition in Developing Countries*, Cornell University Press, Ithaca, New York, NY, USA, forthcoming.

³Saba Mebrahtu, David L. Pelletier and Per Pinstруп-Andersen, 'Agriculture, rural development, and nutrition', in Per Pinstруп-Andersen, David Pelletier and Harold Alderman, Eds, *Beyond Child Survival: Enhancing Child Growth and Nutrition in Developing Countries*, Cornell University Press, Ithaca, New York, NY, USA, forthcoming.

⁴Per Pinstруп-Andersen, Alan Berg and Martin Forman, Eds, *International Agricultural Research and Human Nutrition*, International Food Policy Research Institute and United Nations Administrative Committee on Coordination/Sub-Committee on Nutrition, Washington, DC, USA and Rome, Italy, 1984.

I am pleased to accept the invitation to write a short companion piece to the excellent article by Robert Tripp. As further discussed elsewhere,² recent experience from efforts to alleviate malnutrition indicate that the nutrition problem must be tackled by a two-pronged approach: community-level action with support from government and other external agencies, and nutritionally sound economic, social and other macro-economic and sectoral policies and programmes. Although improved nutrition in most cases is not an explicit goal of broader policies and programmes and although, as pointed out by Tripp, these programmes may be blunt instruments for solving nutrition problems, the nutrition effects can be strong. As pointed out by Tripp, this is the case with successful agricultural research.³

The nutritional effect per dollar spent on agricultural research is not the same for all agricultural research. Therefore, although I agree with Tripp that agricultural research may not be the first best approach for solving nutrition problems, opportunities exist for enhancing the nutrition effects associated with a given investment in agricultural research if research with strong nutrition effects can be identified *ex ante*. If we want music, we sometimes have to move the piano to the piano stool.

Up until less than 10 years ago, such opportunities were almost always perceived to be associated with improved nutritional qualities of individual agricultural products such as more and/or higher quality protein in maize and sorghum. While improved nutritional qualities of individual foods may be an appropriate goal in some cases, it is the nutritional content of the total diet consumed by the high-risk individuals that counts, not the content of a particular food in the diet. This goal may be reached either by changing the nutrient composition of a particular food, eg higher content of certain amino acids in maize, or by changing the dietary composition of existing foods, eg increased bean consumption. The trade-off between the two approaches should be, but frequently is not, considered.

There is now little doubt that the most important nutrition effects of agricultural research that have been successful in reaching the immediate goals of higher production and productivity, lower production risks, changed nutrient composition in crops and higher farm incomes are due to quantity expansions rather than quality improvements.⁴

As further discussed below, the nutrition effects of expanded agricultural production are brought about in various ways and the relationships are more complex than often assumed. The fallacy of concentrating on

direct causal links between agricultural research and nutrition, while ignoring or down-playing the indirect effects, has been clearly demonstrated by recent research.⁵ Unfortunately, even today this fallacy is not always avoided, as shown by the three cases presented by Tripp. It is no wonder that agricultural researchers and research managers fail to incorporate nutritional considerations into research planning when they are told that nutrition is best served by reallocating research resources from those crops of great importance to small farmers' incomes and poor consumers' purchasing power, to obscure native plants with very little economic value to any household with malnourished members. Similarly, the Food First arguments are based on such simplistic reasoning that few agricultural researchers are likely to be convinced of their validity. While these arguments may have a certain value in advocacy, they are not useful in setting priorities in agricultural research. Thus, my guess is that in those two cases, the agricultural researchers did more for nutrition by ignoring the guidelines presented in the name of nutrition. In the third case – quality maize – contemporary nutritional concerns did in fact play a major role in guiding agricultural research. Unfortunately, these concerns were less valid than originally perceived and in retrospect agricultural researchers were misled – although not intentionally – by nutritionists.

The effects of agricultural research on nutrition operate through at least six pathways as shown in Figure 1. The immediate nutrition-related factors influenced by agricultural research are: incomes of agricultural and non-agricultural households at risk of having malnourished members; time allocation by members of such households; food prices; energy and nutrient expenditures; infectious diseases; and direct effects on food consumption by farming households. While the last of these six

⁵*Ibid.*

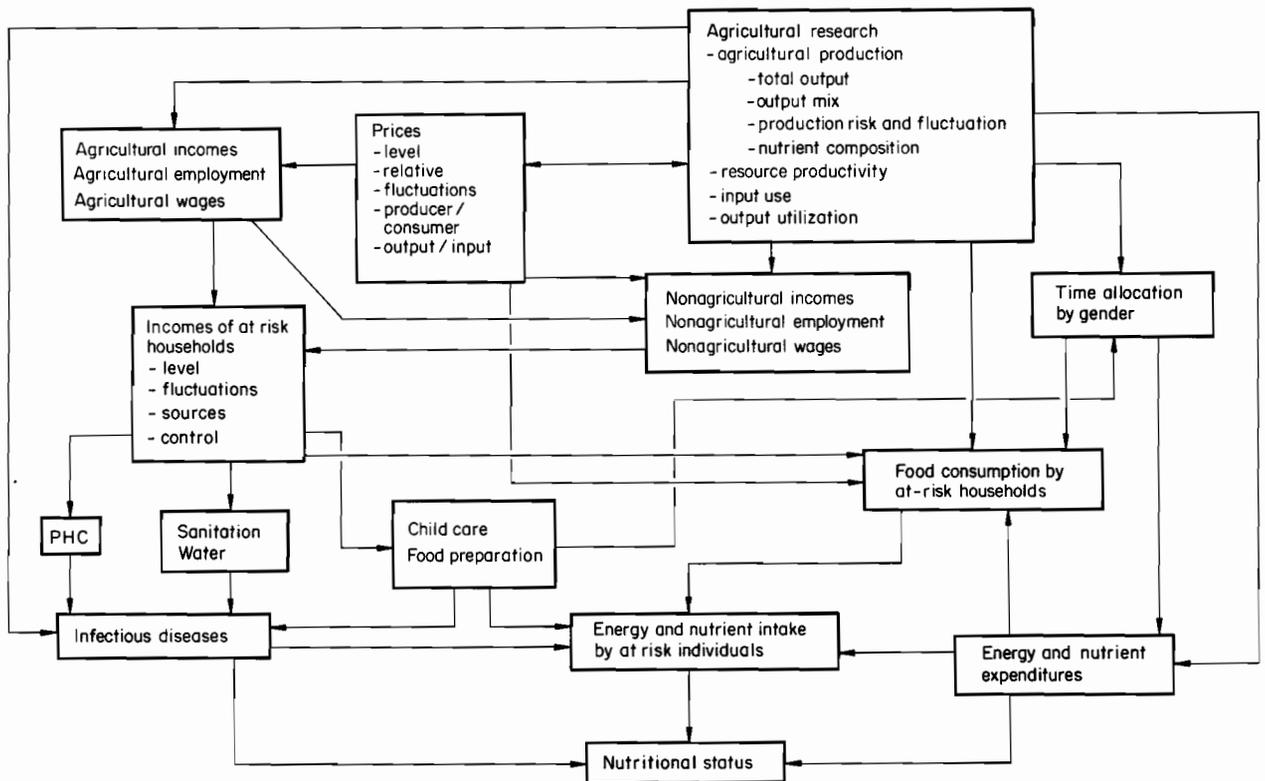


Figure 1. Overview of major links between agricultural research and nutrition.

is frequently the one emphasized, changes in any of the six may affect nutrition, and changes in incomes and prices are likely to be the most important for nutrition.

The utility of identifying the various pathways as illustrated in Figure 1 is that it is easier for agricultural researchers to predict and monitor the impact on intermediary factors such as the six mentioned above than it is to predict and monitor the impact of alternative research on nutrition *per se*. When the latter is attempted, we end up with a very narrow focus on nutrient content of individual foods or new foods, while missing the much more important effects operating through incomes, prices and time allocation changes. This is not an argument for always ignoring opportunities provided by new foods or altered nutrient composition of existing foods, but to explore such opportunities within the overall set of opportunities for improving nutrition through agricultural research. For example, widespread vitamin A deficiencies in many developing countries may be alleviated by changes in the vitamin A content of certain foods or by expanded consumption of foods currently rich in vitamin A. Both may be brought about by agricultural research. Similarly, the problem of low energy density in diets traditionally fed to small children may be alleviated by increasing the density of a food currently forming a part of the diet, eg a higher oil content of maize, or it may be alleviated by enhanced consumption of high-density foods.

There are a number of examples where agricultural research has been successfully guided by nutritional concerns, when these are perceived in the broader context discussed above, including the setting of research priorities at the Asian Vegetable Research and Development Center, exclusion of a protein emphasis in cereal breeding at ICRISAT, and commodity priorities as well as a focus on resource-poor farmers by CIAT.⁶

Agricultural researchers should not be asked to predict and monitor the effects of alternative agricultural research efforts on nutrition *per se*. Instead they should pay attention to the effects on the six factors mentioned above in research planning and priority setting. This is not incompatible with, but goes beyond, a focus on income distribution and equity. Furthermore, the disappointing results of multisectoral nutrition planning during the late 1970s and early 1980s taught us that nutritional goals are most successfully pursued if coalitions are formed with forces seeking compatible goals. It also taught us that planning is not as neat a process as one might expect and that a large number of interests enter into policy decisions. This does not mean that decision makers are irrational. On the contrary, it implies that those involved each pursue their goals which may or may not conform to the overall stated goal of the policy. There is no reason to expect agricultural research planning to be any different. Therefore, nutrition goals are best pursued within agricultural research if coalitions can be identified and exploited. By focusing on the six factors mentioned above instead of nutrition *per se*, a number of possible coalitions can be identified including those related to the well-being of women, poverty alleviation and efficiency goals resulting in either higher producer incomes or lower consumer prices.

It is our job as nutritionists and social science analysts to sort out the relationships between the six factors and nutrition and to identify the relative importance of changes in each for a particular region, country or household group. It is also our job to assist agricultural researchers in

⁶All discussed in Pinstrup-Andersen *et al*, *op cit*, Ref 4.

predicting the impact of alternative research efforts on each of the six. Until we as analysts do our homework and look at the total set of interactions between agricultural research and nutrition, rational agricultural researchers will pursue the immediate goals of agricultural research and assume that the nutrition effect will be positive. Although existing evidence indicates that this may not be a bad assumption in many cases, it ignores a great deal of knowledge now available for enhancing the nutrition effect.