

FOOD AND  
NUTRITION  
TECHNICAL  
ASSISTANCE

**Improving the Nutrition Impacts  
of Agriculture Interventions:  
Strategy and Policy Brief**

Patricia Bonnard

March 2001

**Food and Nutrition Technical Assistance Project**

Academy for Educational Development 1825 Connecticut Ave., NW, Washington, DC, 20009-5721  
Tel: 202-884-8000 Fax: 202-884-8432 E-mail: [fanta@aed.org](mailto:fanta@aed.org) Website: <http://www.fantaproject.org>



This paper was made possible through the support provided to the Food and Nutrition Technical Assistance Project (FANTA) Project by the Office for Sustainable Development of the Bureau for Africa, Agricultural Development Division and the Office of Health and Nutrition of the Bureau for Global Programs Field Support and Research at the U.S. Agency for International Development, under terms of Cooperative Agreement No. HRN-A-00-98-0004600 awarded to the Academy for Educational Development (AED). The opinions expressed herein are those of the author and do not necessarily reflect the views of the U.S. Agency for International Development.

**Published March 2001**

**Recommended citation:** Bonnard, Patricia. Improving the Nutrition Impacts of Agriculture Interventions: Strategy and Policy Brief. Washington, D.C.: Food and Nutrition Technical Assistance (FANTA) Project, Academy for Educational Development, 2001.

**Copies of this publication can be obtained from:**

Food and Nutrition Technical Assistance Project  
Academy for Educational Development  
1825 Connecticut Avenue, NW  
Washington, D.C. 20009-5721  
Tel: 202-884-8000  
Fax: 202-884-8432  
Email: fanta@aed.org  
Website: www.fantaproject.org

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## Introduction

Health and nutrition have a direct impact on a country's productivity and growth. There are the immediate effects of a stronger and healthier work force, as well as the longer-term benefits of improved cognition in better-nourished school children. Nutrition also plays a critical role in determining an individual's health status and ability to overcome illness, including HIV/AIDS.

Malnutrition afflicts a large and increasing number of Africans and impedes the social and economic progress of the continent. About one-quarter of the population is unable to secure adequate food all or part of the year to meet their nutritional requirements.

Food security, as defined by the U.S. Agency for International Development (USAID) consists of three elements: food availability, access and utilization. Agricultural interventions can contribute to the achievement of all three of these elements.

Linkages can exist between agricultural production, income and consumption. For example, increased production can improve income, which, in turn, can improve consumption patterns. The evidence shows that this is more likely to occur under the following four conditions:

- The incremental income is earned or controlled by women
- The stream of income is regular or frequent, even if the absolute amounts are small
- The income is in-kind (i.e., in the form of food)
- Training in health and nutrition is provided.

Similarly, agricultural interventions can strengthen the link between consumption and nutrition, such as by incorporating well-designed health and nutrition training into agricultural programs.

This brief presents recommendations for improving consumption and nutrition impacts of agricultural interventions in four areas: improving cross-sectoral integration, enhancing on impacts of access, increasing impacts on nutrition, and monitoring performance. The brief is based on the findings of a more detailed background paper<sup>1</sup> produced for USAID's Office of Sustainable Development, Agricultural Development Division within the Africa Bureau.

The brief is targeted at USAID Mission staff, particularly Agricultural and Health Officers. The information is most appropriate for Missions in countries with high rates of poverty and malnutrition, where agriculture is a significant source of income for the poor and where the Mission has expressed a strong interest in tackling problems of malnutrition.

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<sup>1</sup> Bonnard, Patricia. (October 1999). *Increasing the Nutritional Impacts of Agricultural Interventions*, Washington, DC, AED, FANTA Project.

## **Background**

### **The Impact of Nutrition**

There is increasing evidence and recognition that the health and nutritional status of a country's work force bears direct correlation to its productivity and growth. Various studies have shown direct or immediate effects of improved nutrition on increased strength and endurance, and thus on productivity (Behrman, 1992). In addition, researchers have observed indirect or long-term effects in the form of enhanced productivity later in life due to the improved cognition of better-nourished school children. According to Nobel-Laureate Robert Fogel (1999), improvements in nutrition and human physiology contributed significantly to the economic growth and technological progress experienced in Europe over the past two centuries. In his view, agriculture and nutrition form a synergistic cycle, whereby each supports and advances the other. Interventions aimed at reducing micronutrient deficiencies have been demonstrated to be very cost-effective (CGIAR, 2000).

Nutrition also plays a critical role in determining an individual's health status and ability to avert and overcome illness. Malnutrition in children increases their risk of dying from common diseases, particularly measles, pneumonia, diarrhea, and HIV/AIDS: 56 percent of all child deaths in developing countries are related to malnutrition (Pelletier, 1994). Studies have shown that increasing preschool children's intake of vitamin A reduces mortality and illness (especially diarrhea), and may prolong the life of HIV-infected children. In fact, malnutrition is an intergenerational phenomenon (Humphrey, 2000). Undernutrition in infancy is strongly correlated with weight at birth, which is highly correlated with maternal health and nutrition.

The relationship between nutrition and HIV is bi-directional. In other words, any immune impairment as a result of HIV/AIDS leads to malnutrition, while malnutrition leads to immune impairment and worsening of HIV, finally leading to AIDS. Therefore malnutrition can both contribute to, and result from, the progression of HIV, and thus needs to be taken into account in countries with a high prevalence of HIV/AIDS.

Poor health status and prolonged illness associated with HIV/AIDS inhibit the productive and income-earning capacity of those afflicted, as well as those who are withdrawn from other productive activities in order to provide care for ailing household members. Household spending on food, education and other basic necessities is often curtailed in order to cope with increased medical expenses (FANTA, 2000). As households absorb additional dependent adults and orphans, the ability to adequately provide for the basic well being of all household members diminishes.

Malnutrition afflicts a large and increasing number of Africans and impedes the social and economic progress of the continent. Although a recent analysis of changes in levels of child malnutrition show that the prevalence of stunting among children under 5 in developing countries has fallen, the absolute number has increased. In Africa the level of stunting fell from 40 percent in 1980 to 35 percent in 2000. But despite these reductions in the prevalence, the number of stunted children in Africa increased from 35 million to 47 million during the same period because of population growth. Within Africa the highest level of stunting is found in

Eastern Africa, where 48 percent of children are currently affected (Onis, Frongillo and Blossner, 2000).

Currently, under-five mortality rates in Africa are around 150 deaths per 1,000 live births. Being malnourished, even moderately malnourished, significantly increases a child's risk of dying from an illness: in Sub-Saharan Africa, of the 56 percent of all child deaths related to malnutrition, a majority (83 percent) of these deaths occur in children who are moderately, rather than severely, malnourished (Pelletier, et al., 1994).

About one-quarter of the Sub-Saharan African population is unable to secure adequate food to meet their nutritional requirements (Badiane and Delgado, 1995). Each year people, particularly those living in rural areas, experience some degree of hunger during the rainy or "hungry" season when food stocks dwindle and roads become muddy and impassable. The hungry season normally corresponds with the peak season for diarrhea, malaria and other diseases that inhibit utilization of ingested nutrients. The large and increasing incidence of malnutrition in Sub-Saharan Africa impedes the social and economic progress of the continent.

### **USAID Definition of Food Security**

Food security exists when all people at all times have both the physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life. According to the USAID definition, food security is comprised of three underlying elements: food availability, access, and utilization. *Availability* refers to an adequate supply of food. *Access* refers to adequate means to obtain food, via home production, the market or other sources. *Utilization* refers to the appropriate biophysical conditions (i.e., good health) required to adequately utilize food to meet dietary needs.

Agricultural interventions contribute to improved food security in several ways. Agriculture plays an important role in ensuring availability, a primary role in strengthening access where household livelihoods are agriculture-based, and a complementary role in utilization in terms of ensuring adequate quality and appropriate processing of a household's food supply. Two additional components of utilization help articulate the three elements of food security so as to reap the greatest benefits in terms of improved nutrition and enhanced productivity: the caretaker's<sup>2</sup> knowledge of health and nutrition, and the caretaker's allocation of time among production, food preparation and childcare activities. Agriculture also generates resources that support the caretaker's successful adoption of new knowledge of improved health and nutrition practices.

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<sup>2</sup>A caretaker is someone who provides "...time, attention, and support to meet the physical, mental, and social needs of growing children and other household members." (ICN, 1992).

## **Agriculture—Consumption—Nutrition Linkages**

As the definition of food security suggests, linkages between agriculture and other sectors can enhance food availability, access, and utilization. This section discusses the linkages between:

- agricultural production, income (food access) and consumption; and
- consumption and nutrition (food utilization).

### **Agriculture Production—Income—Consumption Link**

It is well documented that income generation increases food consumption and improves the quality of diets for poorer households. Several patterns have emerged from research findings. As incomes rise, poorer households spend more on food, although proportionately less than their incomes increase (Kennedy, 1989; Diskin, 1995; Behrman, 1995). Their food purchases become more diverse, and they shift to higher quality foods such as meat and fruits, implying that diets become more diversified and the overall nutrient composition of the diet improves. These findings suggest that the pursuit of standard agricultural sector strategic objectives that promote income generation also promote objectives to increase household consumption of nutritious foods.

Agricultural and Health Officers may reasonably anticipate strong income-consumption linkages, but this outcome is not inevitable. Evidence shows that additional agricultural income in the form of one's own production or cash earnings from crop or livestock sales is more likely to be spent on food if four conditions are met:

- the incremental income is earned or controlled by women
- the stream of income is regular or frequent, even if the absolute amounts are small
- the income is in-kind (i.e., in the form of food)
- training in health and nutrition practices is provided.

Women are primarily responsible for feeding their families and spend more of their income on food than men do (Diskin, 1995; Marek, 1992). They also tend to earn in small regular income flows, which are more likely to be spent on food than are larger more sporadic earnings. Larger earnings are usually spent on non-food items such as school fees, equipment, or appliances, or are invested to improve the means of production.

Most research findings suggest that the introduction of cash crops tends to increase incomes. Some portion of the incremental income is normally allocated to food, but the results are mixed (see Box 1).

Commercialization of agriculture is a common and potentially powerful means to increase rural household income and food access, as well as to diversify production and reduce risks of income and food shortfalls. Additional cash income can also be used to purchase productivity-enhancing inputs and, in some cases, to invest in the farm or new income-generating enterprises (Yanggen, et al., 1998; Diagne, 1999). In general, a greater proportion of additional income (cash and in-kind) is consumed in the form of food when it is derived from food-crop production as compared to when it results from an increase in commercial production (Oniang'o, 1990; Maxwell, 1995). This is particularly true if the commercial production takes the form of a newly introduced farm

enterprise (such as a high-value export crop) as opposed to commercialization of a pre-existing subsistence activity (such as dairy production).

An important caveat in the income-consumption relationship is that increases in household-level consumption are not necessarily equally shared. While the consumption of food by some household members (males and children, especially male children) may improve in terms of quantity and quality, women's food consumption often remains unchanged (Bouis, 1997).

### **Consumption—Nutrition Link**

The link between consumption and nutrition is conditioned by household health, sanitation and environmental factors (Von Braun and Kennedy, 1989; Smith and Haddad, 1998). Poor health impedes effective utilization of food. Health, water and sanitation services—along with health, childcare and feeding practices—determine the effect of increased consumption on the nutritional status of household members, especially women and children.

When agricultural programs are combined with well-designed health and nutrition education, significant changes in participant consumption behaviors are reported. For example, when gardening initiatives were paired with nutrition education or training, households increased their consumption of vitamin A-rich foods and child nutrition status improved (Pratt, 1989; HKI, 1993; Booth and Kuhnlein, 1992). Increased access enables participants to purchase or stock more and better quality food. New health and nutrition knowledge and improved practices create an extra incentive to produce more, diversify production, and retain more food for household consumption.

In sum, agricultural strategic objectives need not be compromised when food consumption, nutrition and health objectives are taken into consideration. When agriculture-based incomes increase through adoption of income-generating innovations, poor and food-insecure households are inclined to spend some of their additional income on more and better quality food. Adhering to the four qualifying conditions mentioned earlier in this section when designing programs is one simple step toward enhancing the nutritional impacts of agricultural interventions. Enhancing the contribution of agricultural interventions in terms of improved nutritional status also depends on health and environmental conditions.

#### ***BOX 1: When to Introduce New Cash Crops***

Critical questions can be posed to determine whether the introduction of a new cash crop will reduce or increase food consumption. Affirmative responses suggest a reduction in food consumption is unlikely. Negative responses signal potential problems, and suggest the need to investigate further and correct identified project design shortcomings.

- Is land in surplus?
- Is labor in surplus, especially female labor?
- Does the new crop (or production system) take advantage of slack labor periods or periods when land is idle?
- Will the additional income be received or controlled by women?
- Is there strong seasonal variability in the supply/price of basic food crops?



## **Strategy and Program Recommendations for Improving Agriculture—Consumption—Nutrition Linkages**

Most USAID Missions in Sub-Saharan Africa work in countries with high rates of poverty and malnutrition, where the majority of the poor depend on agriculture as the primary source of income. While few Missions have explicit nutrition goals or objectives, nearly all Missions' country strategies note problems of malnutrition as either a cause or consequence of poverty and stagnant development. For these Missions, linking agriculture, health and nutrition programs can contribute substantially to overarching development goals. For Missions that already have adopted a food security strategy, building linkages is a necessity.

### **Improving Cross-Sectoral Integration**

Cross-sectoral linkages can be forged at two levels: as part of a Mission's overall strategy environment, and as part of specific programs.

#### **The Mission level**

One approach to cross-sectoral integration at the Mission level is to draft a food security strategy with improved nutritional status as a goal. In the absence of an explicit nutrition goal, Agricultural and Health officers may lack a clear understanding of priorities and opportunities related to nutrition that could guide them in their efforts to improve consumption and nutrition and to ensure integration and overlap with health programs. Absence of a strategy may even lead to increased nutrition problems.

As a prerequisite to drafting a strategy, the Mission will need to review local food security issues. This entails identifying and prioritizing nutrition problems and agricultural constraints and opportunities, including important geographic and seasonal variations, and the distribution of these problems and opportunities among population groups.

The review should also note strategic opportunities, such as slack periods for labor, locally available pre-tested micronutrient-rich varieties, and any comparative advantage in producing a certain high-value commodity. It should capitalize on existing data and information available through DHS surveys, World Bank poverty profiles, PVO household food security and livelihood studies, PROFILES analysis and recommendations, crop and labor calendars, and other means.<sup>3</sup> Its comprehensiveness will depend on available resources. The review process can also foster collaboration with other local and international development agencies, universities, institutes and non-governmental organizations.

This process requires that a wide range of agriculture, nutrition and health stakeholders participate in the process of problem identification, strategy and program design, implementation and evaluation of results. Close collaboration among stakeholders is critical, and Mission officers and their partners need to advocate at both the community and national levels.

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<sup>3</sup> Demographic and Health Surveys are conducted by USAID and various collaborators. PROFILES is an assessment tool that uses current scientific and epidemiological data to relate incidence of malnutrition to four main functional consequences: child mortality, illness, intelligence loss, and reduced productivity. The applications of PROFILES in Ghana helped make nutrition a top priority of Ghana's new national child survival strategy.

For Missions that choose not to draft a food security strategy, but nonetheless have an interest in improving nutrition impacts, the review of local food security issues will still serve as an excellent tool for laying out concerns and identifying program design options.

### The program or sector level

To encourage cross-sectoral integration, Missions could adopt an agricultural program with a strategic objective of improving maternal and/or child nutritional status by increasing production and consumption. However, taking steps to improve the nutrition outcomes of agricultural programs does not necessarily require a change in existing strategic objectives. Intermediate results are another logical avenue for cross-sectoral integration since improved health and nutritional status has a positive effect on productivity and hence economic growth. Intermediate results, together with the corresponding performance indicators, trace out the underlying conceptual framework of a program and point to the type of design components that will likely encourage increased food consumption and better health and nutrition.

Missions have three options for implementing cross-sectoral integration:

- Implementing agriculture and nutrition programs in the same geographical area
- Adding program components to specifically address cross-sectoral issues
- Fully integrating programs.

Collectively, the three options could be viewed as a set of progressive stages toward full integration, but this is not the intention. In some cases, full integration of health/nutrition and agriculture programs would be difficult, costly and unnecessary. These three options should be viewed as independent, but not mutually exclusive or hierarchical. The choice will depend on numerous factors including geographic and temporal overlap of health and nutrition issues and agriculture potential, Mission resources, and available partners.

## RECOMMENDATIONS FOR IMPROVING CROSS-SECTORAL INTEGRATION

1. Conduct a review of local food security issues before drafting a strategy or designing program interventions. In that way, the strategy and programs will account for local macronutrient and micronutrient deficiencies and other health and nutrition issues. Participation of local consultants and/or agencies is desirable.
2. Review the PROFILES nutrition advocacy and policy development program, if one has been conducted for the country. The PROFILES recommendations and key interventions can help determine what strategic objectives or intermediate results can be adopted to address nutritional status, labor productivity, morbidity and mortality.
3. Develop clear nutrition objectives that agriculture-based programs can explicitly address. For example, reducing the incidence of stunting or improving vitamin A status in a specified area are achievable, cross-sectoral objectives.
4. Create a task force comprised of Mission staff and cooperating sponsors working on agriculture, health, nutrition or food security issues. The task force can review country

strategies and programs with an aim to identify and strengthen linkages and to encourage effective cross-fertilization of agriculture, health and nutrition programs.

5. Adopt some form of cross-sectoral integration: by implementing agriculture and nutrition programs in the same geographical area, adding program components to specifically address cross-sectoral issues, or fully integrating programs.
6. Request that responses to new agriculture-related proposals outline key cross-sectoral issues and identify potential collaborators in the field who can serve as resource in the area of health and nutrition.
7. Draft a Mission food security strategy.

### **Enhancing Impacts on Access (Consumption)**

Access to food can be enhanced when agricultural interventions are designed with the following elements in mind: focusing on gender, including realistically addressing the constraints under which Africa's women farmers operate; introducing agricultural innovations that take into account existing practices, such as slack labor periods; and developing ways to make access to food more consistent throughout the year.

#### **A gender focus**

Interventions that aim to increase household income (access) in order to improve household food security should target women, since women are both food and care providers. Agricultural interventions can be designed to encourage the participation of women and to address their specific objectives and constraints (see Box 2). For example, women are not motivated by profit alone, but rather by a blend of profit and family-welfare objectives.

This has important implications for the type of agriculture projects a woman would find attractive and how she would run an economic enterprise.

Historically, innovations in agricultural practices have centered on land preparation and improved input application, both of which are men's responsibilities. Little emphasis has been placed on weeding and harvesting, which are women's responsibilities. Moreover, advances in processing, preserving, and storing produce have been limited, especially for traditional indigenous food crops – also, traditionally women's responsibility.

Experience has shown that bringing women in at the design stage or working directly with them on implementation issues greatly increases their active participation and ultimately the achievement of program objectives. Women can identify appropriate mechanisms for addressing

#### ***BOX 2: Constraints female farmers confront***

Since women account for a significant and growing proportion of Africa's farmers, agricultural program designs should take into consideration women's specific constraints. If programs are not designed to directly reduce or eliminate these constraints, they need to operate effectively within them.

- Unclear or weak land rights.
- Limited access to common property resources.
- Limited access to cash for input purchases.
- Limited access to credit or microfinance.
- Limited access to extension and technology.
- Limited access to education.
- Triple burden (production, chores and childcare).

labor and other time constraints. Since women are an important source of agricultural labor as well as the dominant primary care providers, it is important to account for women's time so that projects are not detrimental to food crop production or family care responsibilities.

### New innovations for food crops as well as commercial crops

In general, some of the negative effects associated with the introduction of new commercial activities—such as increasing demands on household labor and creating disincentives for producing food—can be minimized. Fewer negative effects occur when new cultural practices are introduced for both food production and commercial systems, and when new crops are introduced by taking advantage of land or labor surpluses and by utilizing idle or slack periods. In this way, farmers are less inclined to innovate at the expense of pre-existing food crop production, and the innovative practices will enhance the productivity of food production as well. For example, a USAID project in Uganda helps expand and diversify exports including maize, beans, cassava, oilseeds and high-value crops, such as fruits, vegetables, vanilla and cut flowers. The project promotes the use of improved inputs (seeds and fertilizer), partly through establishing and supporting input suppliers. The project also works with farmers on increasing productivity and greater commercialization of local food crops.

### More consistent access to food throughout the year

Introduction of new crops and post-harvest technologies extends production, income-generating options, and food access over a greater portion of the year. Not only does this promote a steadier stream of income, it reduces risk through diversification. Cultivation of new micronutrient-rich foods adds diversity to the diet, and labor saving post-harvest technologies grant women more time to fulfill production and care-giving responsibilities.

Among the options to ensure steadier and more diverse income streams:

- **Diversification of production systems.** Diversification of the production system can take the form of new intercropping schemes, introduction of high-value crops or non-traditional agricultural exports, establishment of or modifications to pre-existing home gardens, and introduction of micronutrient-rich varieties and crops. One option is to build upon and improve traditional intercropping systems. African farmers intercrop coarse grains in order to reduce income risk and total crop failure. Another alternative is home gardens. There is substantial evidence indicating that home gardens serve as an important source of micronutrients. In some cases, particularly in urban areas, they make a significant contribution to a household's food supply and income.
- **Small-scale agro-processing.** Agro-processing can improve the storability of a product by preserving the quality and making it available over a longer portion of the year, e.g., solar-drying fruits and vegetables, pressing sunflower oil or processing palm oil. By processing and storing a commodity for later resale, the producer can sell in smaller quantities over a longer period of time, achieving a steadier flow of income and capturing a higher price later in the marketing season.

- **Improved storage and inventory credit schemes.** Inventory credit programs (ICP) increase access. Through participation in an ICP, farmers reduce storage losses, capture higher prices later in the marketing season when supplies are low, and guard against family members consuming reserved seed and emergency food stocks. Even when the profit from hungry-season sales is small, farmers still derive benefits from the more consistent flow of income over the agricultural year. In addition, ICP credit is usually the only source of credit available to small farmers, and the loans can be used to invest in existing enterprises or to diversify into new income-earning activities, allowing participants to expand productive capacity and reduce income risk. Some households use the increased liquidity gained through ICP borrowing to better manage their food purchasing requirements, easing periodic food deficits.

All three options promote higher levels of food consumption and better quality diets throughout the year. These options are not mutually exclusive. They can be adopted singularly or in combination.

## RECOMMENDATIONS FOR IMPROVING ACCESS AND CONSUMPTION IMPACTS

1. Target women, accounting for their specific objectives and constraints.
2. Encourage diversification of production systems through intercropping, home gardens, and introduction of high-value crops in a manner that supplements, not substitutes, food crop production.
3. Introduce micronutrient-rich varieties or crops that address local nutrition issues.
4. Promote small-scale agro-processing.
5. Introduce improved storage practices and technology.
6. Help farmers secure better prices for their produce, locate new markets, and control the stream of earning through participation in marketing associations and inventory credit schemes.
7. Encourage adoption by creating and strengthening linkages between agriculture and health and nutrition.

### **Increasing Impacts on Nutrition**

Agricultural interventions can be designed to incorporate characteristics that will have a positive impact on nutrition, if delivered in an appropriate format and by focusing on appropriate messages.

## Nutrition education and training

If the agricultural intervention works through marketing associations or other groups that meet regularly, nutrition education can be included. Attendance is enhanced if the nutrition education and training is attached to other regular meetings (credit repayment meetings) or work-related meetings (marketing association meetings). Nutrition education and training may also be an incentive to participate in these other meetings.

## Content of nutrition messages

Nutrition messages need to be practical, reflecting local nutrition issues and what is manageable within the clients' resource constraints. If more frequent breastfeeding is being promoted, for example, the project design needs to be flexible enough to allow extra time for women to breastfeed. Messages designed for men should mirror their unique responsibilities in providing good nutrition for their families. Examples include educating men on which snack foods are nutritious and how certain agricultural practices can increase health and environmental risks.

## Encouraging adoption through linkages

A program design that effectively links agriculture, health and nutrition might employ the following three-pronged approach:

1. The program has a well-designed agricultural component—effective at generating output, income or added value, as well as at drawing in smallholders, women and/or poorer households.
2. The program has a well-designed nutrition component—providing well-tailored health and nutrition education to address specific local problems.
3. The agricultural, health, and nutrition components are mutually reinforcing. Project staff collaborate to ensure appropriate health services and complementary health and nutrition messages are provided, and that beneficiary populations participating in the agricultural and health activities overlap.

The case of soy-enriched weaning foods in Ghana illustrates one approach to improving the nutrition impact of an agricultural intervention. The Bean/Cowpea CRSP is engaged in a program to introduce nitrogen-fixing soybeans into cropping systems in an effort to improve soil fertility and increase productivity. In the same areas, an NGO is working on malnutrition and improved weaning foods. Soybeans are high in protein, a macronutrient that is deficient in the local community's diet. Noting the excellent opportunity to combine efforts and reinforce each other's goals, the two agencies collaboratively developed recipes and social marketing tools for soy-enriched hand-milled weaning food. They report that consumers have accepted, and are willing to pay for, the product. Hand milling also provides employment for women.

Another example of building linkages is the collaborative effort to introduce new orange flesh (high beta-carotene) sweet potatoes and processing methods in Kenya (Hagenimana and Oynga, 1999). The program experimented with integrating nutrition education into a basically agronomic intervention. The agronomic research identified a crop that is produced and consumed by the local population and easily disseminated through vegetative propagation. The promotion of orange flesh sweet potato cultivation addresses two local nutrition issues. First, sweet potatoes can be cultivated over most of the year to help close the hunger gap. Second, the high beta-

carotene helps reduce vitamin A deficiency, which is a common problem throughout most of Kenya. Processing methods included recipes for fortified weaning foods, as well as combining sweet potato with imported wheat and hence reducing the cost of flour.

## RECOMMENDATIONS FOR IMPROVING NUTRITION IMPACTS

1. Develop a narrow set of well-tailored actionable nutrition messages and lessons that extension agents can disseminate at farmer association meetings and during the course of their regular extension activities.
2. Develop nutrition messages that are basic enough so that agricultural extension agents can deliver them accurately and with confidence.
3. Design the agricultural intervention to facilitate, and not inhibit, the adoption of the nutrition messages and practices being promoted.
4. Take advantage of group-based activities (e.g., marketing associations, small-scale agro-processing plants, and microfinance clubs) to convey nutrition messages and lessons.
5. Know the audience (women, men, different age or ethnic groups, etc.) to understand the messages that will be most effective.

### **Monitoring Performance**

Improvements in consumption and nutrition can result in improved performance of agricultural labor, increased agricultural production, increased food consumption, and improved nutritional status of women and children. To measure these impacts, Missions should be able to associate changes with the specific strategy or interventions. These impacts can be measured directly by program implementers or indirectly through secondary sources such as DHS results, Ministry of Health data or other sources. Where the Mission has developed an integrated strategy for addressing nutrition concerns, many of the indicators for program performance may be collected by health sector activities, and adjusted to reflect interventions implemented by the agriculture sector. It is likely that Missions will have to provide additional technical support to agricultural programs if direct measurement of nutritional status by those programs is required.

### **Choice of an indicator**

Periodic measurement of child and maternal nutritional status is important to confirm that the agriculture-consumption-nutrition linkages are being appropriately addressed. Improvements in child nutritional status can be measured by weight for age, height for age, weight for height, and caloric adequacy of available food (kcal/person/day). Standard measures of improved vitamin A, iron, and iodine status are suitable as indicators of women and children's micronutrient status.

Many standard indicators of food access, such as caloric adequacy, can be difficult and costly to implement in the field. Caloric adequacy measures require somewhat sophisticated and detailed data collection. Similarly, measurement of food expenditures is costly, time-consuming, and requires technically sophisticated enumerators. These conditions may not be easy to satisfy, particularly in Africa and the PVO community.

Alternative simpler indicators are cheaper and easier to apply in the field and have been found to perform adequately (Haddad, Kennedy and Sullivan, 1994; Christiaensen and Hoddinott, 1999). These indicators include the number or type of foods consumed, dependency ratio, or incidence of illness, and they can be used individually or in combinations with other simple indicators. Diet diversity<sup>4</sup> has been found to be associated with better quality diets of both adults and children. It is usually highly correlated with such factors as caloric and protein adequacy, percentage of protein from animal sources, and household income. Diet diversity of women as compared to men is more strongly associated with household food security, and weighted measures of dietary diversity have been found to outperform simple counts.

Another option is to monitor the program characteristics that have been found to promote consumption and suggest better nutrition. Depending on the actual program design, these indicators could include the gender of project participant and innovators, changing seasonality of income (access), labor use, and food or micronutrient-rich food availability.

### Timeframe for monitoring performance

Food-insecure households, especially those with serious food deficits, spend a portion of additional income they earn on food; however, pronounced changes in consumption patterns occur only when households perceive that the increase in income is permanent. Such changes evolve over a period of time. Therefore, one should not expect to see immediate changes in food consumption patterns when incomes shift.

### RECOMMENDATIONS FOR PERFORMANCE MONITORING:

1. Ensure periodic measurement of child and maternal nutritional status to confirm that agriculture-consumption-nutrition linkages are being appropriately addressed. Missions should be able to associate changes to the strategy interventions.
2. Use an appropriate measure to monitor changes in food consumption if the agricultural program has a food security objective.
3. Choose an indicator that the monitoring agent can accurately measure.
4. Use simple, easy to administer indicators of improved consumption and nutrition unless adequate resources and technical capacity are available. Diet diversity is an indicator of household food security that is easy to implement and cost effective.
5. Monitor program design characteristics that promote consumption and suggest better nutrition such as the gender of project participants, innovators and income earners, the unevenness and seasonality of income, or the form (in-kind or cash) of income earned.

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<sup>4</sup>The diet diversity is a measure of the different types of foods consumed over a specific period of time weighted by the frequency each food type is consumed over that period (Christiaensen and Hoddinott, 1999).



## Conclusions

This strategy and policy brief presents recommendations for improving consumption and nutrition impacts of agricultural interventions, emphasizing opportunities for strengthening complementarity between agriculture, health and nutrition program areas without compromising program-specific strategic objectives. The ideas and recommendations presented here are particularly relevant for Missions situated in countries with high rates of poverty and malnutrition, where agriculture is a significant source of income for the poor, and where the Mission has expressed a strong interest in tackling problems of malnutrition.

Agricultural interventions can make important contributions in the form of increasing production and income and, often, household food consumption. However, health and environmental conditions, health status, and childcare and feeding practices will ultimately determine whether increased food access and consumption has a positive effect on nutritional status.

Program characteristics can increase the likelihood that an agricultural intervention will have a strong effect on consumption and nutrition. Although not an exhaustive list, the following are some of key design elements recommended in this brief:

1. Improve integration of agriculture, health and nutrition at the strategy and program levels
2. Target women as income-earning farmers and care providers
3. Take advantage of slack periods in the use of land and labor
4. Close seasonal gaps in food access through production diversification, improved storage, and agro-processing
5. Include well-targeted health and nutrition education components in agricultural programs.

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