

## Linking agriculture and nutrition: The human dimension

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### **Introduction**

During the past 25 years we have seen improvements in nutrition indicators for some vulnerable groups in Sub-Saharan Africa, including young children and pregnant and lactating women. However, these improvements have been slow in coming and uneven in impact (Kurz and Johnson-Welch, 2000). Moreover, with the alarming increase in the prevalence of HIV/AIDS, and in the resulting nutritional implications, it has become an urgent matter to find ways to ensure nutritional security for all.

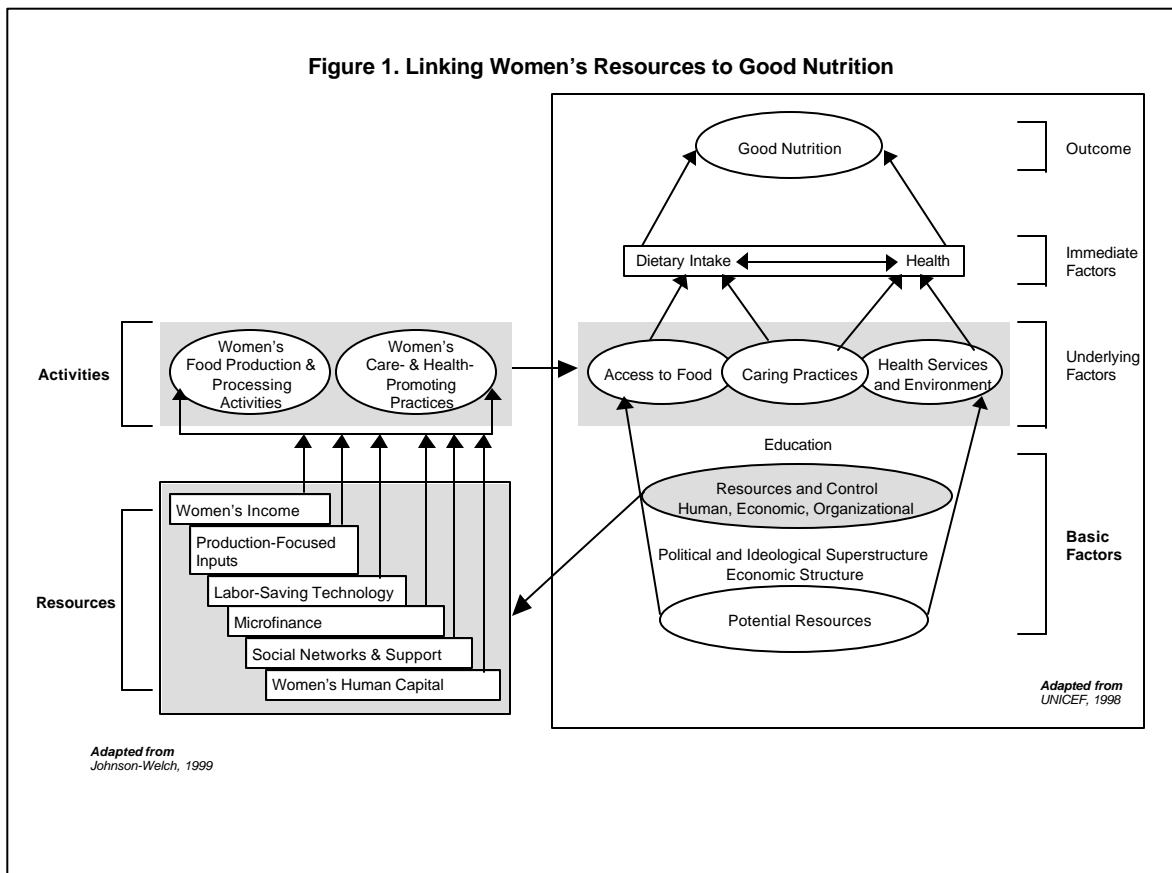
Recently, more and more development practitioners and policy-makers have been discussing how to maximize the contributions that agriculture can make to promoting nutritional well being (Levin et al, 2002). Given the impact that agricultural interventions have on household economies and their contributions to dietary diversification, it is critical to find practical and effective ways to enhance the link between agriculture and human nutrition. It might seem logical and intuitively sound to strengthen such links, but it is not as straightforward as it may sound. We must take purposeful actions to bring them together in a meaningful way. This paper suggests how this can be done in an efficient and effective manner. It begins with a brief review of the conceptual links between agriculture and nutrition, then uses the Kenya sweetpotato intervention research study to illustrate how this link can be made through gender-sensitive strategies that invest in women – as decision-makers, caregivers, income earners and agricultural producers (Hagenimana et al, 1999, 2001; Johnson-Welch, 1999). The value added when gender analysis is used to design, monitor and evaluate intervention studies will be highlighted, followed by lessons learned from the Kenya project that have implications for other efforts to use an agriculture-based intervention to achieve improvements in nutrition.

### **Links between agriculture and nutrition**

Agriculture can influence human nutrition in a number of ways – for example through changes in and access to income; food prices and their variability; labour allocations, particularly of caregivers; energy and nutrient expenditure; nutrient composition of foods; and exposure to diseases, contaminants and chemicals (Mebrahtu et al, 1995). When agricultural products are sold in the market place, the income earned may be used to purchase goods and services that contribute to nutritional changes. Similarly, when those products are consumed directly by members of the producing household, their dietary

intake is affected. It would seem, therefore, that agriculture can make direct contributions to improving nutrition. Unfortunately, that does not always happen, unless other steps are taken. These include attention to factors that promote consumption of foods and ensure good health, and to the persons who influence production and consumption.

Indeed, we know that nutritional well-being is dependent on a set of factors, only one of which is food (UNICEF, 1998). The right-hand side of Figure 1 illustrates the different factors that contribute to good nutrition. Most basic are factors such as human, financial, technical and social resources; underlying factors include access to food, caring practices, health services and a safe environment; and dietary intake and health are the most immediate factors. Clearly, agricultural production and post-harvest activities that contribute to household income and food availability are important but not sufficient for good nutrition.



Despite these obvious linkages, the complex set of factors might make it seem inefficient to try to improve nutrition through a focus on agriculture. This is not necessarily the case. Why not? Because it is as much a matter of careful planning, preparation and design as it is about resources and relationships. Even more, it is about investing in people by building their capacities to solve problems, access technologies and other resources, and

control the allocation of benefits that derive from resource use. This gender-sensitive approach strengthens the links between agriculture and nutrition.

The left-hand side of Figure 1 illustrates how women make the link between agriculture and nutrition through their food production, processing and care-giving activities (Kurz and Johnson-Welch, 2000). When women have the financial, physical, social and human capital and the freedom to make decisions about the allocation of income, food and other goods within the household, children tend to benefit more than when those resources and decisions are controlled by men (Kennedy and Cogill, 1987; Buvinic et al, 1992; Thomas, 1997; Quisumbing et al, 1998).

The Kenya sweetpotato intervention research study illustrates how investments in people and technologies can make the link between agriculture and nutrition. This study (implemented by a multi-disciplinary team from the National Potato Research Centre of the Kenya Agricultural Research Institute, the International Potato Center's Kenya office and CARE/Kenya) was one of five<sup>1</sup> that tested ways to enhance women's contributions to family nutrition, including reducing micronutrient malnutrition (Johnson-Welch, 1999)<sup>2</sup>. The Kenya study compared two interventions in terms of their impact on dietary intake of vitamin A-rich foods by children less than five years of age living in rural, western Kenya<sup>3</sup>. The children were divided into those whose mothers received one of two intervention packages:

- a full package of interventions including inputs and support related to adoption and production of orange-fleshed sweetpotatoes, skill training in food processing, marketing and preparation, care and feeding practices, health and nutrition information, as well as home visits by extension workers (experimental group)
- only agricultural interventions comprising inputs and support related to orange-fleshed sweetpotato production (control group)

The Helen Keller International (HKI) food frequency method was used to measure the effects of the intervention packages on children's nutrition (Rosen et al, 1993)<sup>4</sup>. The food frequency scores of the control and experimental groups were compared before and after the intervention.

Figure 2 shows that the food frequency score for children whose mothers received the full package of resources improved significantly over time (from 4.2 to 5.8,  $p < 0.01$ ), and was significantly better than that of the children in the control group at post-intervention (5.8

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<sup>1</sup> The other studies were conducted in Ethiopia, Tanzania, Peru and Thailand.

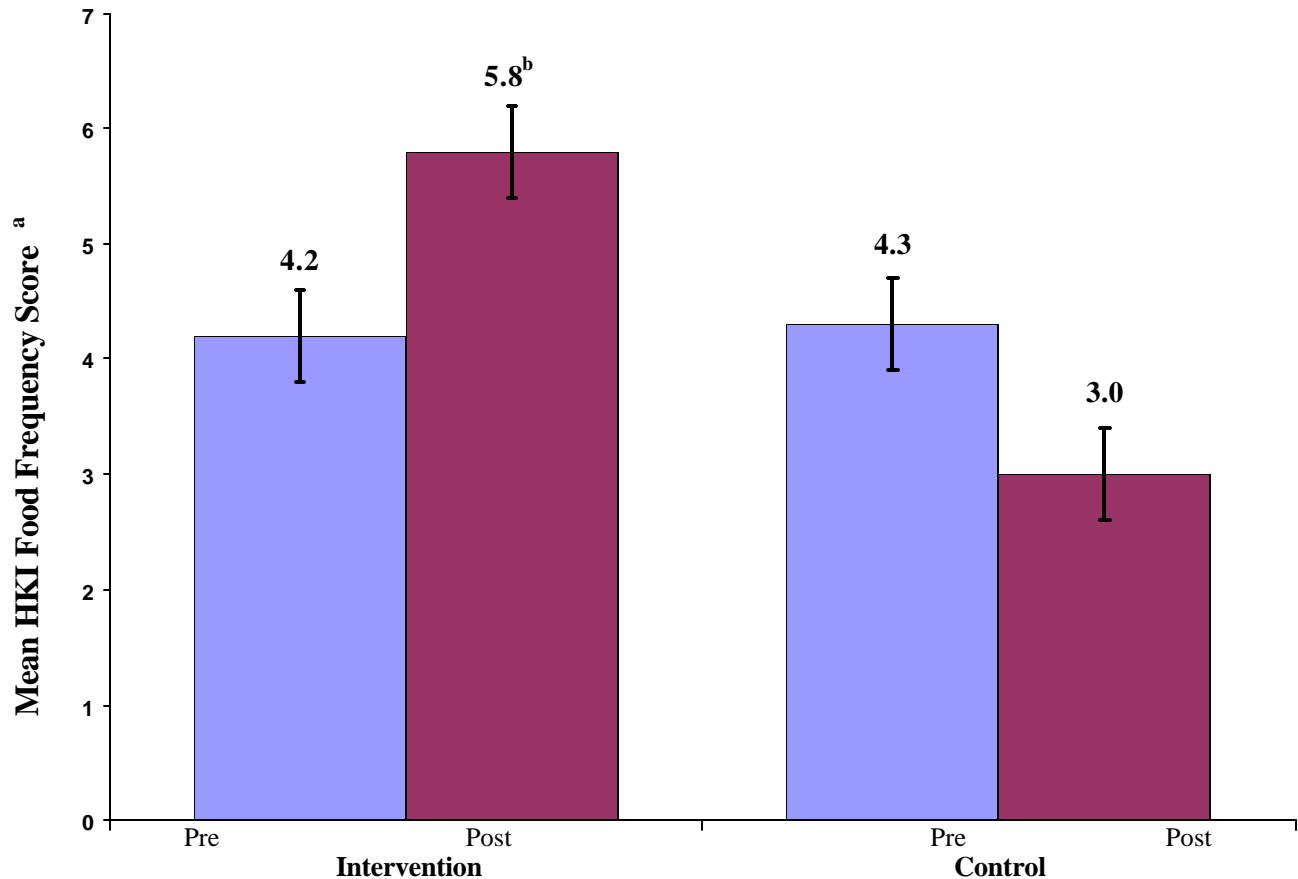
<sup>2</sup> The five-country intervention research study was supported by the Opportunities for Micronutrient Interventions (OMNI), a research project of the Office of Health and Nutrition, Bureau for Global Programs, Field Support and Research, US Agency for International Development.

<sup>3</sup> The study design, sample member description and methods used are more fully described elsewhere. **["ELSEWHERE" IS NOT SUFFICIENT. PLEASE GIVE REFERENCES]**

<sup>4</sup> This food frequency method yields scores that reflect the number of days per week that children under five years of age were reported to have eaten animal and plant foods rich in vitamin A or pro-vitamin A. According to the HKI guidelines, communities with an animal score index of  $< 4$  days/week or a mean weighted total food frequency score of  $< 6$  days/week are considered to be "at risk" of vitamin A deficiency.

versus 3.0,  $p < 0.01$ ). This is particularly important given that this change occurred in less than 18 months and during a time when there was a drought in the region.

**Figure 2. Frequency of consuming vitamin A or pro-vitamin A rich foods in Ndhiwa/Nyarongi, Kenya, n=154 children 0-5 years**



<sup>a</sup> Calculated as days of animal food sources/week + [(days of plant food sources/week)/6]; values below 6 suggestive of vitamin A deficiency

<sup>b</sup> The increase from pre- to post-intervention period was significantly greater in the intervention group (+1.6) than the decrease in the control group (-1.3) (ANOVA,  $p < 0.01$ ).

Why did this happen given the conventional wisdom that it takes much time and effort to change dietary practices? A likely explanation is that the Kenya study addressed both the human, and the technology and other resource elements of behaviour change. By promoting women’s access to a technology, the orange-fleshed sweetpotato that had nutritional value, and other resources such as information and skills, the study invested in those persons who are the key actors in family health and nutrition. It was investments in *women* as the human element that converted investments in technologies and other resources into nutritional benefits.

The study based its design on an analysis of women's roles as agricultural producers and caregivers, and their time and labour allocation, and their decision-making roles relative to the use and distribution of resources and benefits within the household. Analysis of these factors is known as *gender analysis*. This analysis added clarity to the study design, identification of entry points, the development of interventions and measurement of impact.

But, what is *gender analysis*? First, gender is not a synonym for sex. The latter term refers to biological differences of men and women; whereas, gender refers to differences between men and women, girls and boys that derive from social and cultural norms and expectations. For instance, girls may be socialized to be reserved rather than out-going as their brothers are. This may make it more difficult for girls or women to speak up in public. Similarly, traditional norms may view adult women as minors or "property" of men (through the exchange of bride price between the woman's natal family and her husband's family). This status means that women cannot sign legal documents in their own names or cannot own property, limiting their access to loans from formal lending institutions. These are gender differences and the identification of factors that create and perpetuate such differences constitutes *gender analysis*.

*Gender analysis* can help avoid unintended consequences by identifying power relationships between men and women within a household and in their communities; their motivations, perceptions regarding their own and others' roles and responsibilities, and the decisions they make as to allocation of resources and benefits. Involving women without using gender analysis can sometimes lead to unintended consequences. For instance, there were indications that men might take over production of the new orange-fleshed sweet potato varieties once their market value had been demonstrated. If that were the case, it is not clear if children would benefit in a similar fashion to when those resources were in the hands of women.

*Gender analysis* helps avoid falling into stereotypical, gender-blind traps. For example, just as some might think women are only housewives and not agricultural producers because the income they earn from agricultural activities is small and not counted in national financial accounts, others might think of men as only income earners and not caregivers. Yet there is sufficient evidence that neither of these reflects the reality of men and women's lives. By extension, while large-scale agricultural schemes might focus mostly on men, nutrition programs oftentimes invest only in women. However, family nutrition is not just a "women's issue." Women's decision-making power might not be sufficient to enable them to access resources and take actions that promote their families' and their own health and nutrition. Indeed, men's decision-making power impacts on family nutrition directly – through their decisions as to allocation of resources and benefits in the household, and indirectly – through their influence over women's decisions and actions. Ignoring men's influence minimizes their actual and potential contributions to family nutrition. Matching investments in men's awareness and understanding of the consequences of their decisions on family nutrition with investments

that reduce constraints women face in taking and acting upon decisions would enhance the achievement of nutritional and other development outcomes.

There five six lessons learned from the Kenya sweetpotato intervention research study that have implications for the design and implementation of other efforts that aim to link agricultural inputs to nutritional outcomes. In all cases, the lessons illustrate the importance of using good development practices.

The first lesson is that the Kenya study did not expect a single institution or technical specialist to make the link between agriculture and nutrition, rather, it brought together partners with complementary skills to work toward a common objective. It was a **multi-disciplinary team** that made a difference. Second, it did not guess about the relationships between agriculture and nutrition. A **conceptual framework** that laid out the pathways between these two sectors guided the design, implementation and evaluation of the study. Third, the study invested in the **human dimension** by beginning from women's perspectives and identifying their resources needs and decision-making power. While the use of gender analysis could have been done in a more rigorous fashion, attention was given to gender relations in developing the intervention strategy.

Fourth, the team used various research **methods** to develop their intervention package and show impact. These included applying qualitative and quantitative data collection methods in an iterative fashion; selecting an outcome indicator that was sensitive to the intervention, including changes in agricultural production; and comparing results within and across control and experimental groups over time. The final lesson has to do with sustainability. Although data were collected post-intervention, no **sustainability evaluation** has been conducted to-date. Thus, it is uncertain the extent to which short-term changes in agricultural and feeding practices and nutritional outcomes have been maintained over time. It also is not clear the extent to which the technology and practices might have diffused over time, and if the same degree of benefits are realized for the late adopters as for the early adopters. Having this clarity would be useful for the design of other studies that might want to strengthen the process and methods used in the Kenya intervention study.

This study demonstrates how the link between agriculture and nutrition can be made through investments in women. It is not a complicated process; it does not require large capital investments. It does, however, demand careful attention to gender relations if agriculture's contribution to nutrition is to be realized in a meaningful way.

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