Improved Solar Drying of Vitamin A-rich Foods by Women's Groups in the Singida District of Tanzania

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Background

The problem of vitamin A deficiency (VAD) in Tanzania was first assessed in the early 1980susing a hospital-based sentinel surveillance system for xeropththalmia (Foster et al. 1986).Community-based surveys conducted in the late1980s suggested that VAD was a problem of public health significance in Tanzania (Pepping et al. 1988). Data collected by the Tanzania Food and Nutrition Centre (TFNC) suggests that xe-rophthalmia leads to between 2,000 and 4,000new cases of blindness every year, so that, at any one time, as many as 10,000 children are likely to be suffering from nutritional blindness (TFNC1990). It is further estimated that VAD and xerophthalmia affect about six percent of the Tanzanian population and 98 percent of these are children under six years of age. This means thatabout one out of every three children under six are affected by the problem. Although vitamin A deficiency has been found in most agro-ecological zones of Tanzania, subclini-cal cases of the deficiency are more prevalent in the drought prone areas of the country due to limited availability and consumption of vitamin A-and provitamin A-rich foods, particularly vegetables and yellow fruits, during the dry season. In Singida, a dry area in central Tanzania, results of several community-based surveys support this relationship. In a survey conducted during the1991 dry season (October-November), 60 percent of 226 children less than six years old had serumretinol levels less than 20 micrograms/decilitre(mcg/dl) and 15 percent were severely deficient(serum levels less than 10 mcg/dl) (Mselle and Temalilwa 1993). A second study conducted during the rainy season (December) of the same year found that, of 250 children, 35 percent were vitamin A deficient and three percent were severely affected (Kavishe 1993). A final study conducted during the rainy season (March-April)in 1993 found a slightly lower prevalence of VAD, that is, 27 percent of a total of 238 children were VAD with approximately one percent severely deficient (Mselle and Temalilwa 1993).The government of Tanzania has promoted a range of interventions to reduce vitamin A deficiency. These include information-education-communication (IEC) programs to increase awareness and knowledge of the problem, its causes and solutions;

promotion of red palm oil with marketing in the southern highlands; production of vitamin A-rich foods in home gardens; and universal capsule distribution to children less than two years old and to women within four weeks post-partum. Recognizing that a constraint to using food-based interventions in rural areas in Tanzania is the limited supply of vitamin A-rich foods (particularly fruits and vegetables), TFNC, in collaboration with the Ministry of Agriculture, initiated a horticulture pilot project in 1992. The project mobilized community leaders and farmers to establish vegetable gardens and plant fruit trees in five randomly selected communities in the Ilongero Division of the Singida Rural District. Indigenous dark green leafy vegetables, such as amaranth, sweet potato leaves, cowpea leaves, and maimbe, and such fruits as papaya, mango, and guava were promoted in the production-focused project. Farmers purchased seedlings at a subsidized rate from nurseries prepared by agricultural extension agents. These agents also provided technical support in planting, caring for, and harvesting the fruits and vegetables. As a result, there was an increase in production of the promoted plants, although severe droughts beginning in 1995 and seasonal water shortages impacted on yields. An equally important effort to provide year-round sources of vitamin A in Tanzania has been the focus by government and other agencies on improving preservation techniques for vitamin A-rich foods. The most common traditional food preservation method used in Tanzania is sun drying. Foods are placed on mats or the bare ground, primarily by women, and exposed to direct sunlight. While limited inputs are needed to use this technique (principally, the food source and women's time), the technique carries high risks of contamination by dust, birds and other animals and insects, and it changes the natural colors of the unprocessed food products, making it undesirable to some consumers. Further, traditional drying results in excessive losses of carotenoids due to the vulnerability to oxidation that is accelerated by oxygen, ultra violet and visible light, heavy metals, and high temperatures(Clydesdale 1991).To address these issues, improved solar dying methods have been developed and introduced to rural communities worldwide. Compared to sun drying, improved enclosed solar drying provides high air temperatures and consequential lower relative humidities leading to improved drying rates and lower final moisture content of the dried crop. As a result, the risk of spoilage during the drying process and in subsequent storage is reduced (ILO 1978). Drying in an enclosed structure has the additional benefit of providing protection against rain and contamination. All these factors contribute to an improved and more consistent product quality with increased market value. In Tanzania, as in other African

countries, women are generally responsible for food processing activities. Appropriate technologies have long been an accepted means to increase women's efficiency and productivity, and improve house-hold food security (FAO 1959; Huffman in Gittinger et al. 1987; ECART 1994). This is critical given that women can spend on average 15 hours per day in productive activities (Rutahakana et al.1991). In this study, the solar dryers have the potential of increasing efficiency and productivity, with the additional advantage of increasing availability of vitamin A-rich food sources. Thus, it makes sense that the technology be targeted to women—given their roles as food processors, caregivers, and income earners—and that other community members be drawn into the process to support women in their decisions and actions. Improved enclosed solar drying was first introduced to the Singida area in 1992 by TFNC in collaboration with the USAID-supported Vitamin A Field Support Project (VITAL) (Mgoba et al. 1993; Linehan 1994). The technology had been tested in Haiti and the Dominican Republic for drying mangoes and was found to be generally effective and acceptable by community members. The1992 Tanzania project trained local carpenters in the construction of wooden dryers for community use. Women group leaders from five communities were invited to view the construction of the dryers and were trained in preparing foods for drying and proper drying and storage techniques. At the end of the training, dryers were donated to the women (two dryers per community) for communal use. The women leaders were urged to train other women in using the new dryers and constructing more of them. Two years later, the technology had not diffused beyond the original communities nor had any additional dryers been constructed in these communities. This was attributed to the lack of individual ownership reducing the incentive to maintain the communally-operated dryers; the large size of the dryers making them less amenable for household use and expensive to build and maintain; and the low level of awareness of the advantages of the technology over traditional drying processes. The conclusion was that the process of introduction limited its eventual adoption.