

WISHH

World Initiative for Soy in Human Health
Enhancing human well-being through soy



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WORLD OF NEED

*The official international relief and development
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PILOT STUDY:
PROTEIN SUPPLEMENTATION WITH VALUE-ADDED SOY PRODUCTS (VASPS)
IN COLLABORATION BETWEEN WISHH AND CATHOLIC RELIEF SERVICES-
KENYA FOR THEIR ORPHANS AND VULNERABLE CHILDREN (OVC) PROGRAM
IN THE NYANZA PROVINCE IN KENYA



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ACRONYMS

Acronym	Description
CRS	Catholic Relief Services
WISHH	World Initiative for Soy in Human Health
VASP	Value-Added Soy Products
HAZ	Height for Age Z Score (compares height/age to accepted norms to determine stunting at $\leq -2Z$ or ≤ -2 standard deviations from the norm)
WHZ	Weight for Height Z Score (compares weight/height to accepted norms to determine wasting at $\leq -2Z$ or ≤ -2 standard deviations from the norm)
WAZ	Weight for Age Z Score (compares weight/age to accepted norms to determine underweight at $\leq -2Z$ or ≤ -2 standard deviations from the norm)
B/M/VASP	Beans/Maize/Value Added Soy Products group
B/M only	Beans/Maize only group
VASP only	Value Added Soy Products only group
AIDS	Acquired Immune Deficiency Syndrome
ASA	American Soybean Association
CIAF	Composite Index for Anthropometric Failure
DSF	Defatted Soy Flour
TSP	Textured Soy Protein
HIV	Human Immunodeficiency Virus
HG	Hand Grip
HT	Height
WT	Weight

1.0 Introduction and Background

Kenya is located in Eastern Africa and bordered by the Indian Ocean, Somalia, Ethiopia, Sudan, Uganda, and Tanzania. The population is nearly 35 million people with the median age of 18 years old. Approximately half of the population lives below the poverty level. Life expectancy from birth is now less than 49 years of age and the HIV prevalence rate has been estimated at nearly 7%. Risk of waterborne and vectorborne diseases is common in some areas of Kenya. Flooding and recurring drought are annual features to areas of Kenya.

The Nyanza Province in Kenya is one of the poorest and hardest hit by HIV/AIDS. The number of orphans and vulnerable children (OVCs) in this region are steadily rising. Catholic Relief Services (CRS)-Kenya has concentrated efforts in this region by developing partnerships with local community-based organizations (CBOs) to provide education, clinical services, and support for people infected and affected by HIV/AIDS.

There were 600 beneficiary families in CRS-Kenya's OVC program in the Nyanza Province. It was anticipated that 100 beneficiary "families" composed of three orphans/vulnerable children and one caregiver would receive a ration of maize and beans during the project. While it was expected that the addition of calories should improve nutritional status in beneficiary children, there is less assurance of an impact in protein because of the lack of a high quality protein source.ⁱ The addition of value added soy products (VASPs) were well-accepted in a previous pilot studyⁱⁱ and can improve protein impact on health, including improvement in muscle stores and strength.



This six-month pilot was designed to expand on the previous pilot with additional determination of acceptability of the products in OVC beneficiaries and to determine any impact of short-term additional high-quality protein sources on nutrition and health impact measures in four groups of 50 beneficiary families each. The nutrition/health impact measures included growth data (height, weight, mid-upper arm circumference), functional data (hand grip strength), and general health indices (presence of diarrhea, symptom of respiratory illness, and health care access). The evaluation was

expected to capture the relative benefit of the addition of VASPs to programming in the Nyanza Province through CRS partners. As a sub-study opportunity, a graduate student assisted in training and data gathering activities to test alternate methods of reporting nutritional compromise in children under the age of five, which could benefit CRS, WISHH, and other organizations in more precisely reporting baseline status and changes in anthropometric-related risks.

During the period of the study, there was a severe drought and famine throughout the province. In some cases, the rations provided were the only food in the household. Under such

circumstances, very detrimental and deadly findings should be common. This report presents summary results of key findings at baseline and post-intervention follow-up.

2.0 Methods

Two hundred families were targeted to participate in the four leg pilot study. Interventions included beans, maize, and soy; beans and maize only; soy only; and a control group. Four educators were hired, trained, and equipped with educational materials, record keeping logs, and bicycles. All groups received nutrition-related education on basic nutrition principles and food/water hygiene throughout the six-month pilot. Soy groups received training on the use of the soy products at the beginning of the distributions and the educators provided additional training and trouble-shooting throughout the six-month period.

The CRS-WISHH feeding pilot included a six-month intervention adding soy products to the current diets and/or supplementary rations provided through the CRS program to address social/economic needs for orphans and vulnerable children in the Nyanza Province in Kenya. CRS targeted 200 families for recruitment and participation from four partner sites providing their services to provide a comparison between the following four regimens for an anticipated average household of three children and one caregiver as shown in the table below.



Table 1. Intervention Groups

Group 1	Group 2	Group 3	Group 4
Beans + Maize + VASP: 25 grams protein per person per day in the household ration of 120 grams TSP and 80 grams soy flour; maize and beans ration was 15 kg maize and 15 kg beans per household per month plus education	Beans + Maize only: maize and beans ration was 15 kg maize and 15 kg beans per household per month) plus education	VASP only: 25 grams protein per person per day in the household ration of 120 grams TSP and 80 grams soy flour plus education	Control: Education only with no rations

Data collected included demographic information (location/site, birthdate and age, gender), anthropometric (height, weight, mid-upper arm circumference) and functional measures (hand grip strength), and history of malnutrition-related disease (recent respiratory and diarrheal illness) according to the schedule shown in the table below. Children under five years of age were categorized in standard categories for undernutrition and according to a composite index for anthropometric failure (CIAF).

Table 2. Data Collection Schedule

Data	Baseline	Month 6
Demographics	X	
Nutrition measures (height, weight, MAC, grip)	X	X
Symptoms (diarrhea, respiratory symptoms)	X	X
Acceptability and utilization		X



The two groups that received soy products were surveyed for their understanding of the program, the product utilization, and the acceptability of the products as a part of their diets. In addition to the survey conducted during the fifth month of the six-month intervention, four educators were assigned (one to each group) to follow-up for the duration of the project, providing basic nutrition and food safety education, food utilization training, to determine any ongoing challenges in utilizing the soyfood products, and provide support optimal program impact.

Results of the measurements and surveys were entered into EpiInfo Statistical Evaluation package (Centers for Disease Control and Prevention, 2005) and evaluated for means, frequencies, and other descriptive analyses.

3.0 Results

A total of 191 families were enrolled and 727 individuals were measured at baseline. At follow-up 283 measures were completed.

3.1 Objective Measures: Results of the anthropometric measures (summarized in the table below) showed that at follow-up showed that despite widespread drought and famine, 47% gained weight and 23% were able to maintain weight. Midupper arm circumference improved in 32% and remained stable in 37% at follow-up. Functional measures taken a hand grip strength improved in 17% and 24% and was maintained in 53% and 47% for left and right hand respectively.



Drought and famine affect health and nutritional status of children most. At baseline 66% showed no severe anthropometric failure, 21% were stunted, 11% were underweight for age, and 2% were underweight for height (wasted). At follow-up 62% had no anthropometric failure while 21% were stunted, 15% were underweight for age, and 2% were wasted. In evaluating the change in category for each individual child, 2% showed significant improvement and 90% showed no change in stunting category; 5% improved and 92% maintained their category for underweight for age; and 1.3% showed significant improvement and 98% showed no change in the wasting category.

Table 3. Summary of Changes in Objective Measures in Children

Indicator	B/M/S	B/M	Soy only	Control
Stunting*	3% imp 90% mtn 7% dec	<2% imp 90% mtn 7% dec	1.5% imp 88% mtn 11% dec	<2% imp 93% mtn 7% dec
Underweight*	7% imp 89% mtn 4% dec	4% imp 94% mtn 2% dec	5% imp 91% mtn 4% dec	4% imp 92% mtn 4% dec
Wasting*	1% imp 97% mtn 2% dec	2% imp 97% mtn 1% dec	2% imp 97% mtn 1% dec	<1% imp 99% mtn 0% dec

*only reported for children under five years of age; imp = improved; mtn = maintained; dec = declined

3.2 Program Understanding: There were varying opinions on why they received the soy rations, ranging from the actual intent to support nutritional status and health of households with beneficiary OVCs to misunderstandings such as, “the food is for people with HIV infection.”



Of the households that provided follow-up data for the two soy rations groups, 39 knew why they were receiving the products. When asked how long they thought they would receive the soyfoods, 34 knew that the program duration was six months and 29 did not know how long to expect to receive the soyfoods.

Because the program intended to look for a health and nutrition impact, we asked if they felt the food has made the household members feel better or healthier. 53 respondents said that they noticed feeling better and better health, 3 did not notice a difference, and 7 said that they didn’t know. Around 45% suggested that they felt more energetic or stronger. Those who felt the food did not make them healthier suggested that they had potential side effects of abdominal discomfort or diarrhea when eating the soyfoods.

3.3 Program Utilization: The survey explored how the food was utilized and how many in each household routinely ate the soyfoods. Upon opening the packages that they received, most (91%) stored the food in sealed plastic containers. A mean of 5.5 people per household routinely consumed the soyfoods (range from 3 to 11 people). The program was originally planned for three children and one caregiver. Therefore the amount of protein consumed by each person may have been somewhat different from the original plan. All of those who responded said that they knew how to prepare the soyfoods. In the logs of the educators, it was apparent that this sometimes required follow-up training, especially for the use of soy flour. In the case of TSP, a few did not rehydrate the product prior to cooking. In a couple of cases, they added the TSP directly to stews without a problem. In a couple of cases, the educators had to provide additional training on the rehydration of the product because it became a common complaint that the TSP used too much oil. Most used the soy flour with other flours in chapatti, ugali, or porridge. The TSP was used alone, mixed and fried with vegetables, or put into stews. A few beneficiaries noted that they ate more vegetables with the TSP than they would have normally.

Beneficiary households noted that their soy rations lasted a mean of 23 days with a range of 7-30 days. While this was intended as a monthly ration, it may not have routinely lasted as long as intended because of the additional household members who routinely consumed the products and because of the diminished food resources during the famine/drought period.

3.4 Program Acceptability: The soyfoods were very well liked with 95-97% who liked the look, taste, and mouthfeel. Two respondents noted that they did not like one or more of these attributes when they first tried the product, but that they became accustomed to and learned to like the products. TSP was better liked than flour with a couple of beneficiaries noting that they liked the flour best in chapatti, which required the purchase of expensive flours to blend with it. There were also comments on how the soy flour easily burned, which was corrected through educator training in their follow-up visits. Many comments were made about the unexpectedly large amounts of oil that was required to cook the TSP, suggesting that an emphasis on the rehydration of the product will be an important part of training. In some cases, households that were located farther from the lake found it difficult to have enough water on hand to adequately hydrate the TSP.



Alex brings thank you note for WISHH, CRS, and partners.

While most thought the products were healthy, a few noted transient or ongoing side effects. Two noted the possibility of an allergic reaction by a child in the household, several noted diarrhea or other forms of abdominal discomfort. In five cases, this limited the use by either the caregiver or one of the children living in the household. In each of these cases, the caregiver continued to prepare the soyfoods for others in the household while seeking alternate food sources for those who didn't tolerate the soyfoods as well.

3.5 Open Comments: Several participants chose to add comments, most of which were a request for program continuation, an increase in amounts provided, and the addition of oil to cook the TSP. Positive comments on the products included liked taste, felt energetic and stronger, didn't feel hunger after eating TSP, kids like taste, as well as thanks for the program. Negative comments included three cases of stomach upset, noting that they did not have water to properly hydrate the product so that they used too much oil, and taking a while to get used to the characteristics of the products. In the educator logs, some beneficiaries noted that they learned a lot about nutrition and food safety issues and had additional interest in further nutrition and health education to improve their use of all food products as well as the soyfoods.

4.0 Discussion

For approximately three months of the six-month project the area experienced severe drought and food shortages. In some cases the rations provided were the only source of food for the households measured. While this presents limitations in interpreting the objective data, it was suggested by partner implementers that their beneficiaries were likely to have shown more serious effects on their nutritional status and health than if they did not receive the soy rations. In addition, the Nyanza Province borders Lake Victoria, which is an important source of animal-based food support. The groups were located in different areas of the Nyanza that had different local food resources, particularly in the form of quality protein from local fish. Groups that were located farther inland from the lake were less likely to have quality protein resources than those within a few hours walking distance.

The significantly smaller numbers in the follow-up groups make it difficult to establish a clear follow-up effect and are possibly skewed to show a greater level of maintenance than may have been achieved in the groups that did not receive VASPs.



Overall, the most impressive result of the study was the ability of participants to generally resist losing ground on objective measures during drought and famine periods. This pilot suggested that nutrient priorities are still an important feature of intervention and that soy protein sources will work best when accompanied by adequate sources of calories. The addition of soy to other rations showed some improvement in weight catch up and strength measures. The addition of even

small rations of calories and protein may be able to blunt the impact of drought and famine on the beneficiaries of the program. VASPs were highly acceptable by both children and adults and can help to augment both calories and protein sources.

ⁱ High quality protein is defined by the protein digestibility index or PDCAAS.

ⁱⁱ Report on file with CRS-Kenya and WISHH.