

Multi-Sectoral Programming Case Study

OFSP: Biofortification as a nutrition-focused agricultural intervention

Key Takeaway: The World Vision Mozambique Title II DAP Evaluation/Results Report showed a marked increase in consumption of vitamin A rich foods among intervention households. This was accompanied by increases in production of OFSP along with positive changes in knowledge about vitamin A rich foods and child intake of vitamin A.

What is Biofortification?

Biofortification is the process of breeding food crops rich in bio-available micronutrients. One biofortified crop is OFSP. It is already being widely disseminated, particularly in Sub-Saharan Africa. Unlike most crops, even unimproved OFSP is rich in vitamin A, and efforts to biofortify OFSP have included selection and breeding for even higher concentrations of vitamin A precursors known as carotenoids. Also see Towards Sustainable Nutrition Improvement at <http://www.aec.msu.edu>.

Why Orange-Fleshed Sweet Potato?

- Contains high levels of carotenoids.
- Well accepted by young children who are usually targeted.
- Easy to cultivate and vegetatively propagated.
- Fairly drought-resistant once established.
- Good source of energy for children and adults.
- Less labor-intensive than most crops, so it is attractive to labor-constrained households, such as those affected by HIV/AIDS.
- Can be planted over a broad range of time without considerable yield loss.
- Prices are generally low enough to encourage home consumption.

Innovations

The WV Mozambique Title II DAP took several steps to ensure effective implementation and to maximize the potential for impact of this innovative agriculture and nutrition intervention.

What worked?

- Integrated agriculture and nutrition components at every step of planning and implementation.
- Established links between researchers and communities through implementing partners.
- Identified and selected nutrient-dense varieties that met the needs of farmers and the preferences of consumers.
- Consideration of the roles of women and the constraints they face as farmers.
- Included strong nutrition education and demand creation components, using multiple channels, and targeting diverse audiences.
- Addressed sustainability through efforts to develop local markets for OSFP.

Interventions:

- Farmers received free OFSP vines via farmers' associations as per government extension practices at the time.
- Demand was stimulated through multiple communications channels including community theater, radio spots, visible presence at local markets, and nutrition extension.
- Integrated agricultural and nutrition extension services reached women and men farmers. Extension supported production, storage, processing, commercialization, and marketing to create demand.
- Nutrition extension aimed to improve infant and young child feeding practices using OFSP as one input.
- A grading/pricing scheme was developed in partnership with a trader, rewarding quality.
- Several processed products were developed and marketed ("golden bread" and OFSP juice).

Results:

- OFSP was one of the cheapest sources of vitamin A in local markets.
- Children who participated in the intervention were more likely to consume OFSP as a result of the program.
- Vitamin A intakes among children participating in the intervention were higher than in non-participants.

What Could Work Better?

Free vines meant farmers had limited incentive to preserve vines for planting next season; sustainability depends on ability and willingness of farmers to invest in vine conservation and multiplication, or a willingness to pay for vines. Farmers also had difficulty keeping the vines viable throughout the dry season so they could use them for the next planting season.

Final Takeaway on Dietary Approaches to Increase Vitamin A Intake

Scale-up of dietary interventions is limited due to a lack of research to clearly document the impact of dietary approaches on health outcomes.

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Sincerely,

Colette Powers

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Director, WVUS GAM Global Food Resources

Where do we Work?

In 2008, WVUS GAM Global Food Resources is managing USDA Food for Progress and Food Education and USAID/FFP Title II food aid grants in the following countries, Afghanistan, DPRK, Ethiopia, Haiti, Honduras, Indonesia, Lesotho, Malawi, Mongolia, Mozambique, Rwanda, Sierra Leone, Sri Lanka, Uganda, Zambia and Zimbabwe.

What do we do?

World Vision United States (WVUS) Grant Acquisition and Management (GAM) Global Food Resources is a full-service technical assistance provider that assesses, designs, supports, and evaluates short- and long-term food aid development and relief activities. We foster vibrant community-based activities that develop local capacity to address food insecurity and build resilience against future shocks. GAM Global Food Resources addresses the most pressing problems related to food insecurity, primarily through:

- Preventive Mother and Child Health (MCH) and Nutrition Interventions
- HIV and AIDS, Nutrition and Food Interventions
- Agricultural Production and Marketing Interventions
- Early Warning Interventions



To learn more about World Vision's work, please visit us at www.worldvision.org To learn more about World Vision United States Food Aid Programs, please visit us at www.wvfoodresourcesworkshop.com



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BUILDING FOOD SECURITY SERIES

WORLD VISION INSTITUTIONAL CAPACITY BUILDING



Multi-Sectoral Programming:
Focus on Vitamin A: Health, Nutrition, and Agriculture

Understanding the problem, needs and response

Why is Vitamin A Important?

Vitamin A is an essential micronutrient associated with maintaining good vision, preventing illness and aiding recovery from infections. In children and pregnant women, vitamin A deficiency is linked with increased mortality. Data suggest that almost 1.3 million children die unnecessarily each year due to causes related to vitamin A deficiency.¹

This document provides clarification on appropriate doses of vitamin A supplements for target groups and shows how to link supplementation with other program activities, including those that aim to improve vitamin A status through dietary change. Clear evidence-based information is presented in order to help field practitioners advocate to Ministries of Health (MOH) and other government entities for changes in policies, protocols and programming.

A Note on Dosage Recommendations: In each country, the MOH has its own policies and protocols on vitamin A dosage, based upon WHO guidelines. In 2002, the International Vitamin A Consultative Group (IVACG) reviewed recent research and made new recommendations on post-partum and infant supplementation (The Anney Accords). In response to recent research and the IVACG recommendations, WHO is currently revising its guidelines, which will be released in late 2008.

Where do I get Vitamin A capsules?

Children: In most countries, vitamin A capsules can be sourced through the MOH or UNICEF.

Women: Currently there are no donors supporting supplement procurement for this group, so procurement will vary depending on the country.

How can supplementation coverage be increased?

Social marketing and information, education, and communication campaigns can greatly increase demand for capsules and supplementation coverage.

Fortification:

- ☑ The most common fortified foods include sugar and vegetable oil. Eight countries are currently fortifying these products, and reaching at least 50% of the population. Other countries have initiated smaller scale efforts.
- ☑ Vitamin A fortified products (such as those in Title II commodities, including vegetable oil) can be safely consumed during pregnancy and lactation.
- ☑ Large-scale fortification requires considerable political will and systems that can ensure regulatory oversight at all levels. The other remaining problem with fortification is quality assurance of the fortified product.

Dietary Approaches:

- ☑ For children zero to five months, breastmilk is the best source of vitamin A. After six months, breastmilk continues to be an important source of vitamin A.
- ☑ Many Title II programs have made efforts to increase vitamin A consumption in the diet through promotion of vitamin A rich foods. The promotion of orange-fleshed sweet potato (OFSP) throughout Mozambique is an example. Foods rich in vitamin A include:
 - Fish, eggs, liver, OSFP, mango, papaya, orange or yellow squash (all orange colored fruits and vegetables)
- ☑ There is new evidence that the typical mixed plant diet of vegetables and fruits consumed in developing countries cannot feasibly provide the beta-carotene children need in order to maintain adequate vitamin A status.³

Vitamin A-fortified Title II Vegetable Oil

Vegetable oil is fortified with vitamin A (retinol palmitate) at the rate of 60-75 IU/g.



Vitamin A Supplement Recommendations:

Infants Less than 6 months:

Breastfed infants: Breast milk is the best source of vitamin A for infants.

Non-breastfed infants: 50,000 IU supplement, orally, once

- ☑ *Currently, there are no supplementation activities for children in this group. Research in Southern Asia has shown promising results, but more research is needed, especially in sub-Saharan Africa.²*

Children:

Children 6 to 11 months: 100,000 IU, orally, once

Children 12 to 59 months: 200,000 IU, orally, every 4 to 6 months

Strategy for Delivery: Child health days or weeks, Growth Monitoring and Promotion Sessions, de-worming campaigns, other child health services. The main barrier to success is the absence of a dedicated delivery mechanism.

Pregnant Women:

Night blindness diagnosed during pregnancy should be treated with daily oral doses of 10,000 IU daily or 25,000 IU weekly, for 4 to 8 weeks. The practical feasibility of daily and weekly supplementation is challenging. Access to these supplements is poor in most countries.

Caution: High dose supplements (200,000 IU) are not safe during pregnancy and can cause birth defects.

Post-partum Supplementation:

One oral dose of 200,000 IU

- If **breastfeeding**, within 8 weeks of delivery
 - If **not breastfeeding**, not later than 6 weeks after delivery
- Supplementation should occur as soon as possible following delivery in order to maximize maternal vitamin A status, breastmilk vitamin A content, and vitamin A status of the breastfed infant.*

Strategies for delivery: Post-partum clinic visits, or linkage with child BCG vaccination.

Special Circumstances:

Measles: Vitamin A Dosage for Children with Measles

Age	Dosage Day 1	Dosage Day 2	Dosage Day 14-28 (if clinical VAD or severely malnourished)
<6 months	50,000 IU	50,000 IU	50,000 IU
6-11 months	100,000 IU	100,000 IU	100,000 IU
12-60 months	200,000 IU	200,000 IU	200,000 IU

Persistent Diarrhea: Vitamin A Dosage for Children with Persistent Diarrhea (diarrhea for more than 14 days)

Age	<6 months	6-11 months	12-60 months
Dosage	50,000 IU	100,000 IU	200,000 IU

Bioavailability means how much of a particular nutrient is available for the body to use.

Carotenoids, which our bodies convert to vitamin A, are found in plant products. If we eat these plants products alone, the carotenoids are more bioavailable in some foods than in others (see table below). Fat is needed for the body to absorb carotenoids, so even if large quantities of carotenoid-rich plant products are consumed with little or no fat, the body cannot absorb and convert them to vitamin A. Unlike carotenoids in plant foods, preformed vitamin A (or retinol) found in animal and dairy products does not have to be converted by the body. This is the form of vitamin A our bodies use most.

Hierarchy of Carotenoid Bioavailability

- Higher** Carotenoid supplements in oil (Vitamin A fortified vegetable oil in Title II programs)
- Red palm oil
 - Yellow/orange/red/green fruit
 - Yellow/orange tubers
 - Lightly cooked yellow, orange or green vegetables
 - Fruit juice
 - Fresh vegetable juices

Lower Raw yellow, orange or leafy green vegetables

Source: March of Dimes (2002). Nutrition Today Matters Tomorrow.



Resources:

WHO Guidelines on Vitamin A Supplementation: http://www.who.int/immunization_delivery/interventions/vitamin_A/en/index2.html
 IVACG Statement: The Anney Accords to Assess and Control Vitamin A Deficiency, Summary of Recommendations and Clarifications <http://inacg.ilsa.org/file/Anney.pdf>
 A2Z: The USAID Micronutrient and Child Blindness Project <http://www.a2zproject.org/node/30>
 Sommer A and Davidson F. Proceedings from the XX International Vitamin A Consultative Group Meeting, Assessment and Control of Vitamin A Deficiency: The Anney Accords, J. Nutr. 132:2845S-2850S, September 2002. <http://jn.nutrition.org/cgi/content/full/132/9/2845S>

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 Child Survival Technical Reference Materials: Nutrition. 2007. <http://www.childsurvival.com/documents/trms/tech.cfm>
 Nutrition Today Matters Tomorrow: A Report from the March of Dimes Task Force on Nutrition and Optimal Development. March of Dimes, 2002. http://www.marchofdimes.com/professionals/14480_1926.asp
 For IEC Materials: Media/Materials Clearinghouse, Johns Hopkins University <http://www.m-mc.org/>

¹ West, KP (2002) Extent of vitamin A deficiency among preschool children and women of reproductive age. *J.Nutr.* 132: 2857S-2866S.
² Rolf DW, Klemm AB, Christian P, Rashid M, Shamin AA, Katz J, Sommer A, and West K. Newborn vitamin A supplementation reduced infant mortality in rural Bangladesh. *Pediatrics* 2008 122; e242-e250.
³ West, C.E., Ellander, A and van Leishout, M. (2002) Consequences of revise estimate of carotenoid bioefficacy for dietary control of vitamin A deficiency in developing countries. *J.Nutr.* 132:2920S-2926S.
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