Vitamin A Intakes Remain Higher Among Target Groups

Three Years after a Biofortification Intervention in Mozambique

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Agriculture and Nutrition Interventions

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- but little rigorous evidence that links the two
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Vitamin A Deficiency

- Vitamin A Deficiency (VAD) is a serious health concern in Mozambique (and Uganda)
- VAD causes increased severity of illness and can lead to blindness
  - Responsible for up to 30% of deaths among children under 5 in Mozambique
- Main intervention to combat VAD has been supplementation
  - Per beneficiary supplementation is cheap, but . . .
  - Requires a national campaign, and . . .
  - Coverage is incomplete

REU Project: Biofortification

- Took place between 2006 and 2009 in Zambézia Province, Mozambique, and Uganda
- Used an *integrated* approach to promote OFSP adoption to reduce vitamin A deficiency among mothers and young children
  - Seed Systems Component (Production)
  - Demand Creation Component (Consumption)
  - Market/Product Development Component (Exchange)
- Large research component, many partners
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Objectives of this Paper

- Understand impacts on major outcome goals: Vitamin A Intakes and Prevalence of Vit A Inadequacy
  - Summarize impacts at endline (Hotz et al., 2012)
  - We'll look at impacts three years after the intervention took place (2012)

Impact Evaluation Design

- Model 1, Model 2, Control Groups (Cluster Randomized Trial)
  - Villages were stratified approximately by district (Mopeia and Nicoadala combined to make one strata)
  - Control group only got vines in 2010 after evaluation component was complete
- Impact Evaluation Surveys
  - Socioeconomic Survey : Included information on household demographics, agriculture, and knowledge gains from program
  - Nutrition Survey: Included 24 hour recall module to measure individual dietary intakes of vitamin A and other nutrients among young children and their mothers
  - Repeated Measures: Surveys conducted in late 2006 (baseline), 2009 (endline), 2012 (after intervention)

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Sample, Medium Term Survey

- Returned to same clusters for socioeconomic survey (April-May) and dietary intake (July-August)
  - Ideally, we would have started the dietary intake earlier
  - Not as many OSP available by the time we got to the field
- Sample was designed to both follow children who had been 6-35 months old in previous survey (2009) and to capture a repeated cross-section of under 3 year olds . . .
  - And all of their mothers

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Sample Size, by Year

	2006	2009	2012
under 3's	386	280	193
3-5 year olds	–	386	202
Mothers	394	393	346

Analysis Plan

- Examine cross-sectional differences in retention and intakes, by treatment and control, in 2012
  - Main measure: micrograms (μg) of vitamin A in diet
  - Focus on children aged 6-35 months (repeated cross-section) and mothers
- Compare with impacts found in 2009 at end of the project
- Look at the *source* of differences in dietary vitamin A
- Examine prevalence of vitamin A inadequacy

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OSP Retention and Food Frequency

Variable	Treatment	Control	*p*-value
Grew OSP, 2012	0.276	0.134	0.002
	(0.038)	(0.020)	
Frequency of OSP Consumption,	0.943	0.482	0.038
past 7 days (under 5)	(0.129)	(0.146)	
Frequency of OSP Consumption,	0.824	0.410	0.045
past 7 days (under 3)	(0.128)	(0.127)	

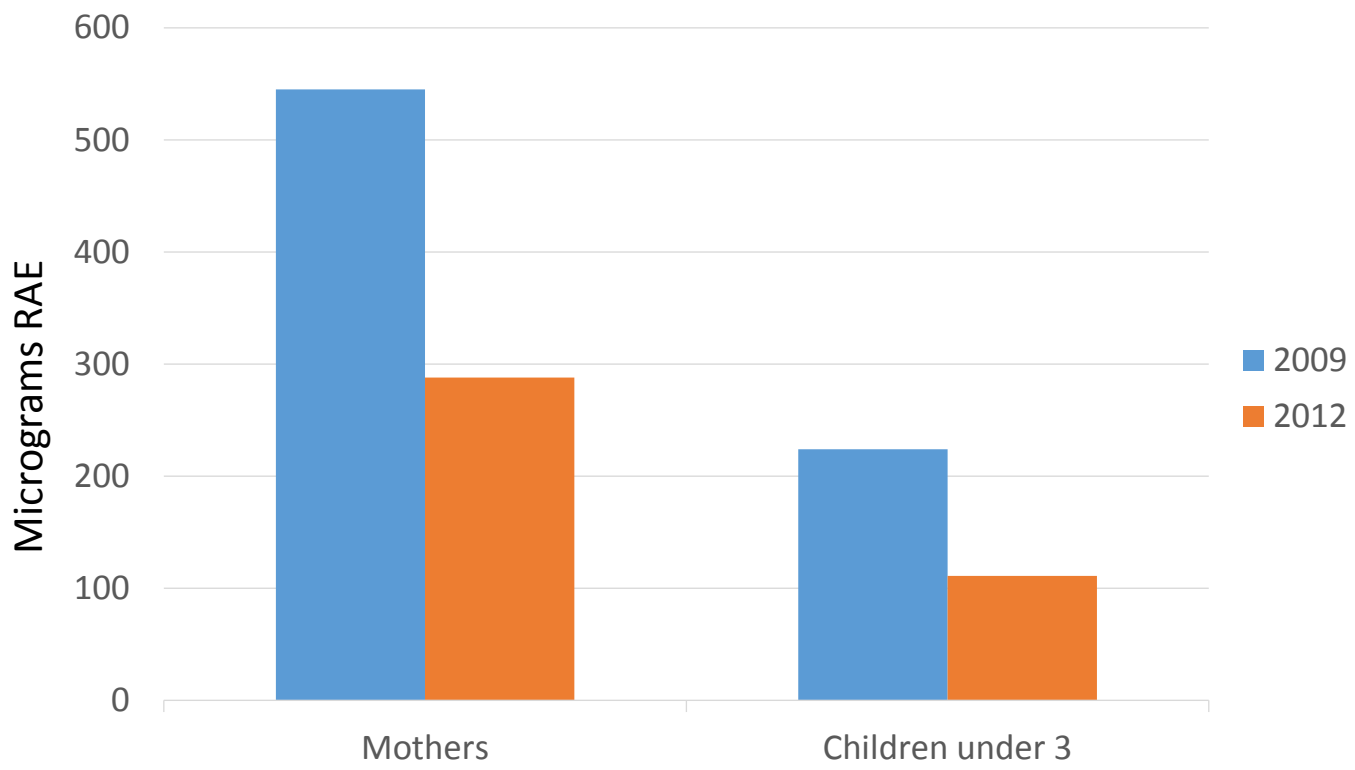
Average Difference, Intakes, Treatment and Control Groups

	Treatment	Control	*p*-value
Children under 3,	264.9	147.1	0.040
no adjustment	(47.1)	(28.7)	
Children under 3,	236.6	196.6	0.032
BLUP	(12.6)	(12.4)	
Mothers,	626.2	349.1	0.004
no adjustment	(68.7)	(43.9)	
Mothers, BLUP	485.3	426.7	0.017
	(15.0)	(15.2)	

Medium Term: Dietary Intakes in 2012 (Regression Results)

	Children under 3	Mothers
Cross-Section	108.5**	288.5**
	(49.6)	(90.9)
Difference-in-Difference	101.9*	323.5**
	(59.3)	(147.9)

Comparison with Results from Hotz et al (2012)



Sources of difference in vitamin A intakes, Treatment vs. Control

	Children under 3	Mothers
OSP	104.9	287.6
Other plant sources	8.7	−12.5
Animal Sources	−2.5	1.9
Total	111.1	277.1
Number of Obs.	193	346

Prevalence, Inadequate Vitamin A Intakes, 2012

	Children under 3	Children under 5	Mothers
Treatment	43.7	44.9	62.2
Control	59.3	53.6	67.8
Difference	15.6	8.7	5.6
p-value, difference	0.129	0.302	0.429

Summary

- Find that children under 3 and mothers continue to consume more vitamin A in treatment clusters than in the control
- Difference in vitamin A intakes is almost entirely attributable to OSP consumption
- Also lower prevalence of inadequate vitamin A intakes, but not statistically significant

Some implications

- Implies that just distributing vines is not enough (control group got vines in 2010)
- Children studied here were not yet born when intervention ended, implying some lasting benefits to the program
- Improves overall cost effectiveness of the program
- In designing further programs for Mozambique or similar environment, more thought can be placed in how to ensure lasting local sources of OSP vines

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