Evaluating the Effectiveness of a Nutrition-Sensitive Agriculture Intervention in Western Kenya:

Design and Preliminary Findings of the Mama SASHA project

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Linking Agriculture & Nutrition to Health: the search for alternative effective delivery systems

- 5 year study in Western Kenya (2009)
- Can linking OFSP access and nutritional training to existing health services provide:
  - an incentive to pregnant women to increase health service utilization?
  - increases in consumption of OFSP and other vitamin A rich foods by the women and their young infants in a cost-effective manner?
- Partners: CIP in collaboration with PATH (International Health NGO), Univ. of Toronto, Emory Univ., CREADIS & ARDAP ( 2 Local Agricultural NGOs), MoA & MoH
The Orange-fleshed, pro-vitamin A rich sweetpotato is a nutrition superfood!

Very rich in pro-vitamin A
1 small root (100g) meets the daily vitamin A needs of a young child

Also has good levels of vitamins C, E, K, several B vitamins, manganese, potassium & dietary fiber
Mama SASHA Project: testing linking OFSP to health services for pregnant women for increased impact on nutrition in Western Kenya.
EVALUATION STRATEGY

1. Cluster randomized at facility level
   - 4 intervention and 4 comparison facilities across Bungoma and Busia counties

2. Cross sectional baseline and endline surveys (n>2000 / round)
   - Objective: Assess population level impact on child nutrition
   - Design: 2 stage cluster randomized surveys in catchment areas of intervention and control facilities; Mar-May 2011 and Mar-May 2014
   - Detailed costing data for cost-effectiveness analysis – Abstracts

3. Nested Cohort Study (COVA)
   - Assess individual level impacts on maternal and child nutrition
   - Design: Longitudinal study of 505 women enrolled in pregnancy and followed to 9 months postpartum; Nov 2012-July 2014
Timeline for major implementation and research activities under Mama SASHA

2009: Plan intervention, develop impact pathway & design evaluation

2010: Pilot intervention in other communities (May 2010-Mar 2011)

2011: Operational Research Round 1 Nov-Dec 2010


2013: Baseline survey (Mar-May 2011)

2014: Operational Research Round 2 Apr-Aug 2012

2015: Analysis & Write-Up

Vine distribution to control communities (Mar-June 2014)

Cohort (COVA) (Oct 2012-June 2014)

Costing Study (Dec 2011-June 2013)
PROJECT REACH (Implementation from March 2011 to August 2013)

- 14 DVMs established
  - 4 intervention sites
- Over 4,600 women reached
- 7,159 voucher pairs issued
- 4,464 redeemed (63%)
  - 3,281 women

- CHWs established and run 215 PMCs/LMCs
  - 2,764 members
  - 25,141 attendances
  - 784 mothers participated monthly
  - 254 newly recruited women monthly
## PRELIMINARY FINDINGS: Endline

<table>
<thead>
<tr>
<th>Catchment Areas at Endline</th>
<th>Extent of Participation in Intervention Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
</tr>
<tr>
<td>Sample size</td>
<td>1164</td>
</tr>
<tr>
<td>Percent growing OFSP</td>
<td>49.5%</td>
</tr>
<tr>
<td>Frequency of Intake of OFSP (days/week) during hunger period; Mean (SD)</td>
<td>0.8 (1.5)</td>
</tr>
<tr>
<td>Frequency of Intake of OFSP (≥3days/week) during hunger period; %</td>
<td>14.3%</td>
</tr>
<tr>
<td>Frequency of VA Intake Score; Mean (SD)</td>
<td>2.4 (2.2)</td>
</tr>
<tr>
<td>Frequency of VA Intake Score,% &gt;6 (adequate consumption);</td>
<td>7.1%</td>
</tr>
</tbody>
</table>

**Finding 1:** Production of & frequency of intake of OFSP and dietary VA were significantly greater among intervention & full participation groups at endline
**Finding 2:** Percent HH consuming OFSP; Maternal nutrition, health and childcare knowledge and early ANC attendance were significantly higher in the intervention & full participating groups at endline.
**Finding 3:** There were significant differences indicating better status for children in intervention than in control areas for stunting and underweight, however these were not confirmed by extent of participation figures in the intervention.

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<tr>
<td></td>
<td>Intervention</td>
</tr>
<tr>
<td>Sample size</td>
<td>1160</td>
</tr>
<tr>
<td>Stunting (Height for Age (HAZ)), Mean (SD)</td>
<td>-0.77 (1.44)</td>
</tr>
<tr>
<td>Stunting (&lt;-2 HAZ), %</td>
<td>18.3%</td>
</tr>
<tr>
<td>Underweight (Weight for age (WAZ)), Mean (SD)</td>
<td>-0.28 (1.20)</td>
</tr>
<tr>
<td>Underweight (&lt;-2 WAZ) %</td>
<td>7.1%</td>
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</tbody>
</table>
PRELIMINARY FINDINGS: Endline

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<tr>
<td></td>
<td>Intervention</td>
</tr>
<tr>
<td>Sample size</td>
<td>926</td>
</tr>
<tr>
<td>RRB, Mean, (95% CI)</td>
<td>1.58 (1.53, 1.62)</td>
</tr>
<tr>
<td>VAD (RBP &lt;0.825 µmol/L), %*</td>
<td>18.8</td>
</tr>
</tbody>
</table>

* RBP <0.825 µmol/L which is biologically equivalent to 0.7 µmol/L of retinol; values have been adjusted for the influence of subclinical inflammation (CRP > 5mg/L).

# Values available for VAD were: Intervention (n=926) and control (874).

# Values available for CRP were: Intervention (n=1135) and control (1077).

DBS analyzed for RBP at KEMRI/CDC, Kisumu, Kenya. Quality control done at CSDE Biodemography Lab, Univ. of Washington, Seattle, WA.

Finding 4: The prevalence of inflammation adjusted VAD (i.e. RBP <0.83umol/L) was significantly lower in intervention & participating groups at endline
PRELIMINARY FINDINGS: Impact

Figure 1: Change in prevalence of \textit{underweight} among children 6-23 mo of age from baseline to endline$^1$

Figure 2: Change in prevalence of \textit{stunting} among children 6-23 mo of age from baseline to endline$^1$

<table>
<thead>
<tr>
<th>Prevalence of underweight</th>
<th>Baseline</th>
<th>Endline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>18%</td>
<td>12%</td>
</tr>
<tr>
<td>Intervention</td>
<td>16%</td>
<td>10%</td>
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Impact estimate = \(-6.5\)%**

<table>
<thead>
<tr>
<th>Prevalence of stunting</th>
<th>Baseline</th>
<th>Endline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>29%</td>
<td>21%</td>
</tr>
<tr>
<td>Intervention</td>
<td>27%</td>
<td>19%</td>
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</tbody>
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Impact estimate = \(-10\)%**

$^1$Difference-in-difference (DID) impact estimates between control & intervention groups controlled for child sex, clustering. Data from baseline and endline surveys. ** p<0.05 for DID estimates.
PRELIMINARY FINDINGS: Outcome

Figure 3: Change in prevalence of VAD among children 6-23 mo of age from baseline to endline

Impact estimate = -5.1%**

1Difference-in-difference (DID) impact estimates between control & intervention groups controlled for child sex, clustering. Data from baseline and endline surveys ** p=0.04 for DID estimates.
Preliminary findings indicate that integrated ag-nutrition-health interventions are worth considering!

- **Cohort study** (early pregnancy till 9mo postpartum)
  - Intakes of vitamin A significantly higher among both mothers & children in the intervention group at 8-10 months postpartum; Differences in VA intakes were attributed to OFSP consumption

- **Cost analysis** (financial costs of integrated Mama SASHA project)
  - Over 5,400 women participated in monthly pregnant mother clubs at a cost of $63 per woman
  - There were 18,730 contact points (in 3 years) at a cost of $30 per contact
  - Of 4,629 women who received vouchers, 3,281 women redeemed vouchers and planted OFSP at a cost of $110 for woman and her infant

- **Cost-effectiveness** (Mama SASHA was cost effective)
  - $1882/DALY averted < WHO Threshold of 3 X GDP of country ($994 for Kenya)

**Disability-Adjusted Life Year (DALY)** is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.
LESSONS LEARNED

FROM MAMA SASHA PROJECT
What is essential on the agricultural side?

1) Varities that produce as well as the best local and taste good
2) Access to quality planting material – a challenge in drought prone areas requiring a new technology – Triple S
3) Better knowledge of disease (virus) & pest (weevil) management

Breeding in Africa for Africa 46 of new varieties since 2009
Of which 37 are orange-fleshed

Triple S Method (SSS)
Storage in Sand & Sprouting
What investments are needed on the nutrition side?

1. **Investment in community-level nutrition education**
   Repetition of consistent messages alongside demonstrations in group based sessions for a year sufficient for OFSP uptake & incorporation into the young child diet

2. **Men matter--- don’t ignore them as they often control land access & also influence diet choices**

3. **Extension personnel need quality job aids**

4. **Save costs by using existing farmer or social groups as an entry point**
Lessons learned in fostering integration include:

1. Training community health workers/CHWs and healthcare workers/nurses on
   I. Instruction on OFSP agronomy
   II. Nature of OFSP planting cycle / season
   III. Good nutrition & counselling on vitamin A
   IV. Use of voucher (nurses)
2. Involvement of CHWs in counselling at ANC (busy schedule for nurses)
3. Provision of IEC counselling cards, posters (at HFIs), leaflets (distributed at ANC)
4. Health workers and agriculture extensionists jointly trained on seed systems & nutrition
5. Feedback meetings of stakeholders from health and agriculture sectors
Thank you from the Mama SASHA Team

RESEARCH AND IMPLEMENTATION TEAM
Frederick Grant, PhD | International Potato Center
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Moses Wamalwa | International Potato Center
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