

Integrating nutrition education & agriculture-based small business development leads to improved child growth in rural Ghana

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Take-home message

Interventions that address the local needs for knowledge, skills, and resources result in...

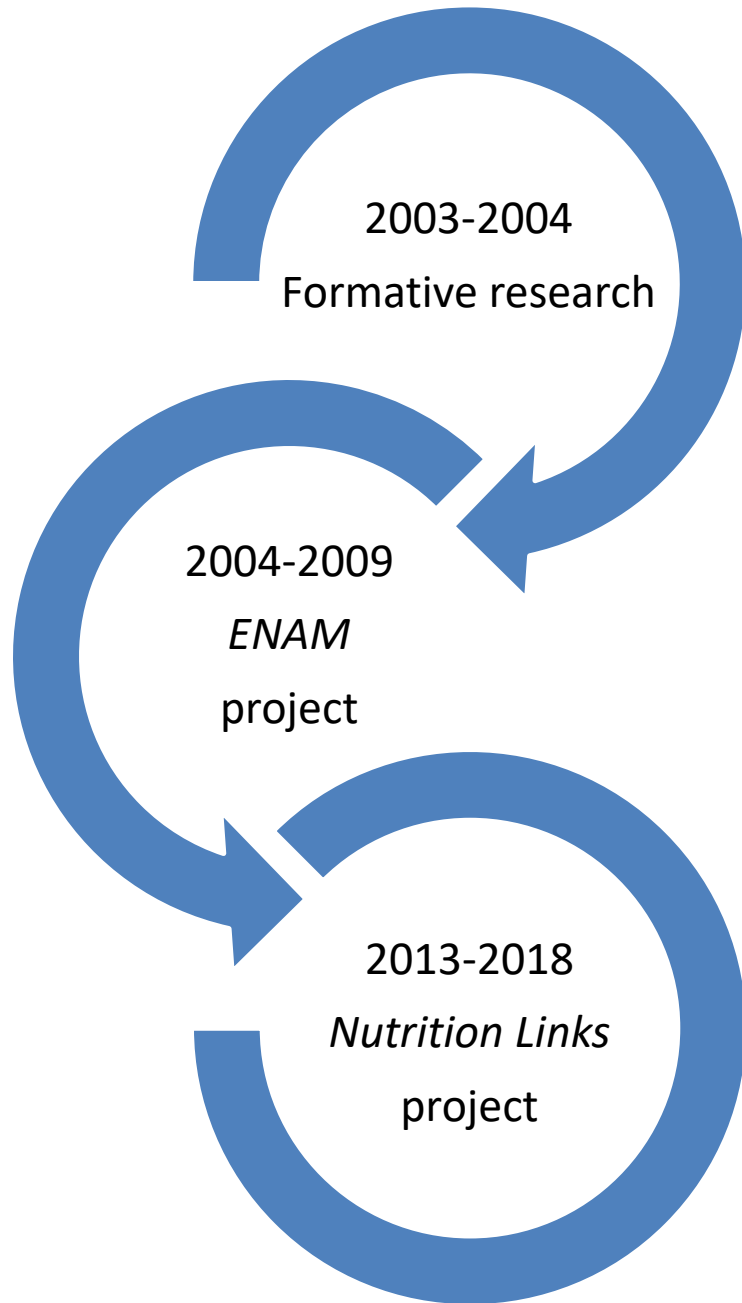
Improved economic and social status for women



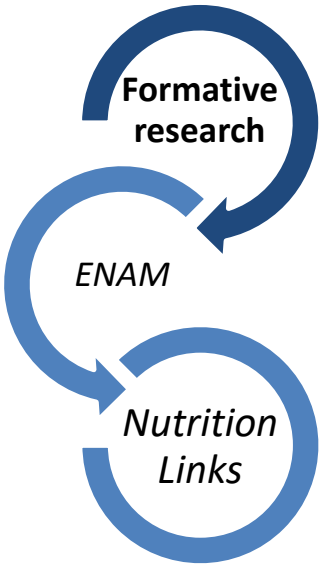
*Improved child
nutrition*



Series of field activities



- Development of a problem model for the constraints to animal source foods (ASF) in children's foods in Ghana
- Improve households' access to ASF
- Improve knowledge and skills of caregivers relative to ASF and child nutrition
- Improve nutrition of preschool-aged children
- Enhance local and regional human capacity to address needs for increased ASF
- Harmonize nutrition knowledge across institutional staff, community residents, and caregivers of infants and young children
- Increase women's income through poultry egg production
- Improve the quality of young children's diet and nutritional status
- Improve the quality of district support services



Formative research methods in 3 regions

Focus groups/interviews

- Caregivers
- Community workers
- Program managers



Tracked sources of ASF

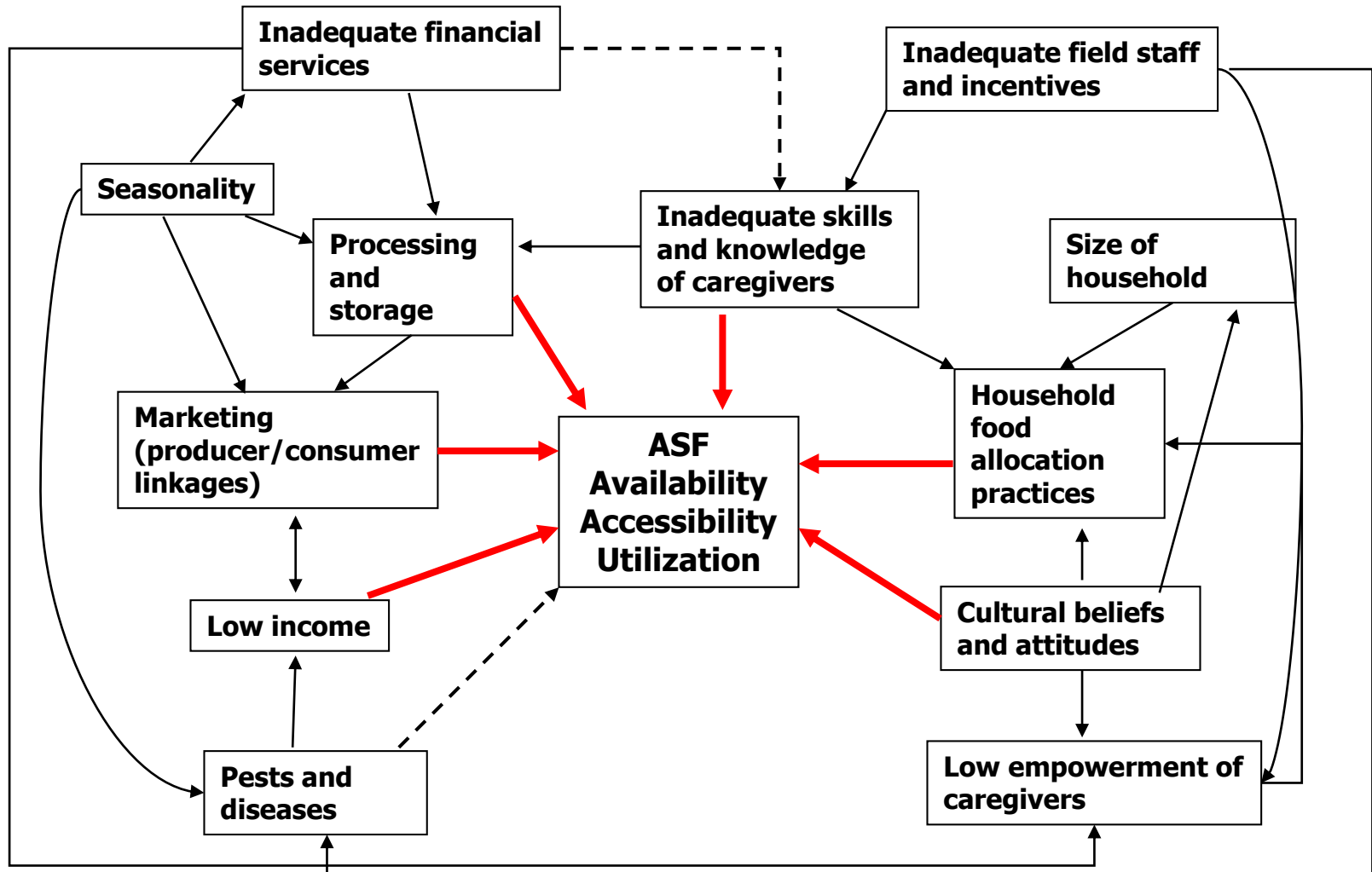


Stakeholders' workshop

- Government
- NGO
- Trade associations

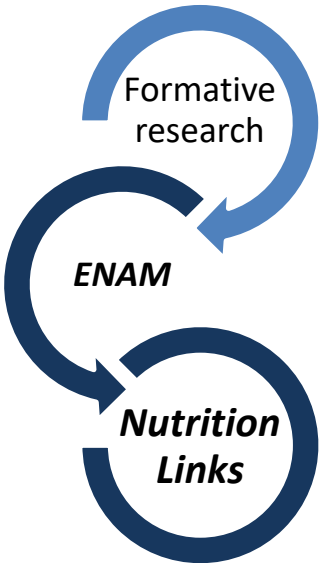


Problem model



→ Key constraint → Secondary constraint - - - - - Indirect

Intervention locations



ENAM project

- 3 regions
- Upper East
- Brong Ahafo
- Central

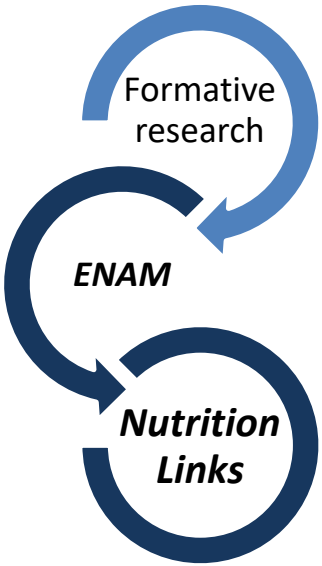
12 communities

Nutrition Links project

- 1 region
- Eastern

39 communities

Intervention designs



ENAM project

Quasi-experimental (Cluster)

16 months

Treatment groups :

- Group 1: Intervention
(6 communities; n=179)
- Group 2: Internal comparison
(group 1 communities; n=142)
- Group 3: External comparison
(6 communities; n=287)

Participants

- Caregivers and 2- to 5-y olds
- Two phases
(Interv: n=134; n=45)

Nutrition Links project

Randomized controlled trial (Cluster)

12 months

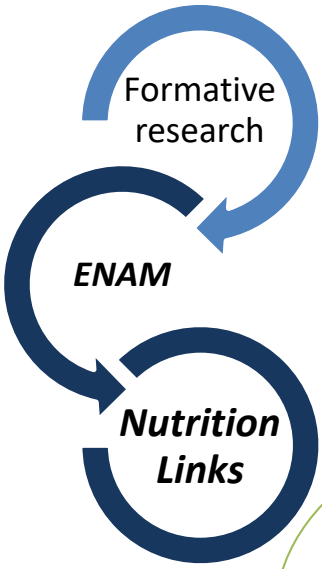
Treatment groups:

- Group 1: Intervention
(19 communities; n=287)
- Group 2: Control
(20 communities; n=213)

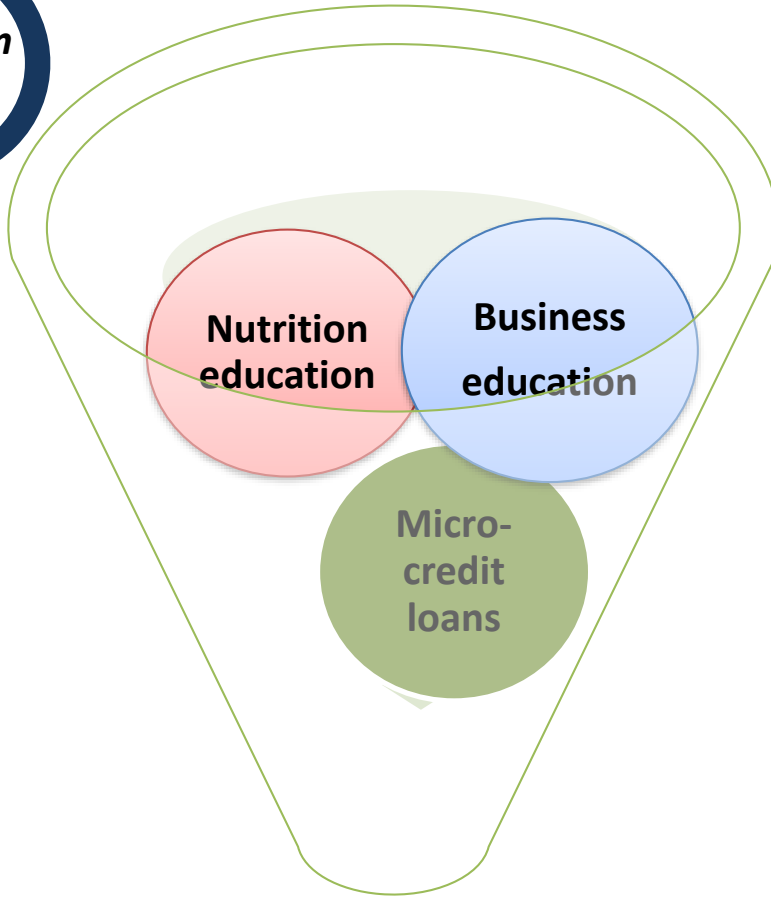
Participants

- Caregivers and infants/<18 mo
- Two phases
(Interv: n=194; n=93)

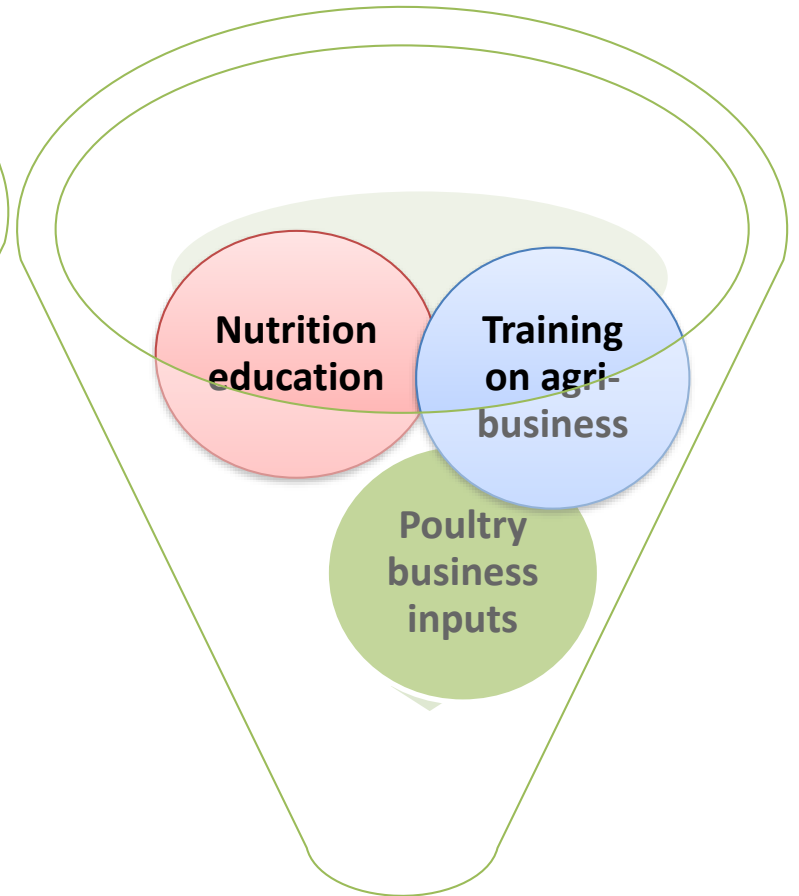
Intervention components



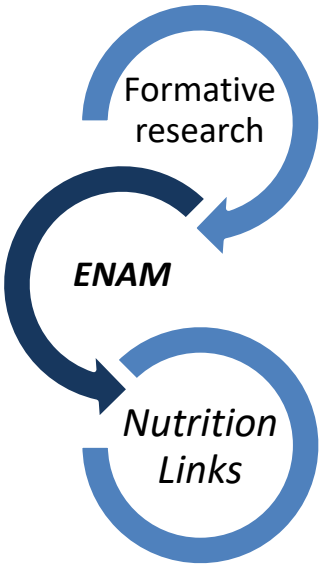
ENAM project



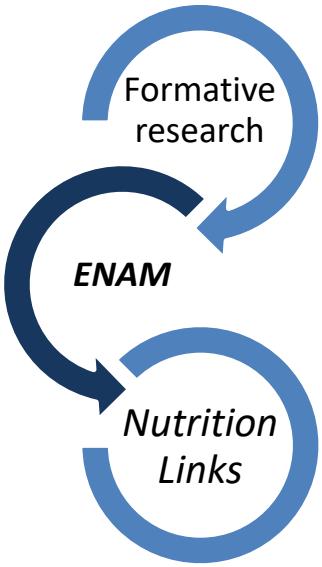
Nutrition Links project



ENAM project intervention



Enam = “animal-based products” (Twi)
Enhancing child **Nutrition** through **Animal** source food **Management**



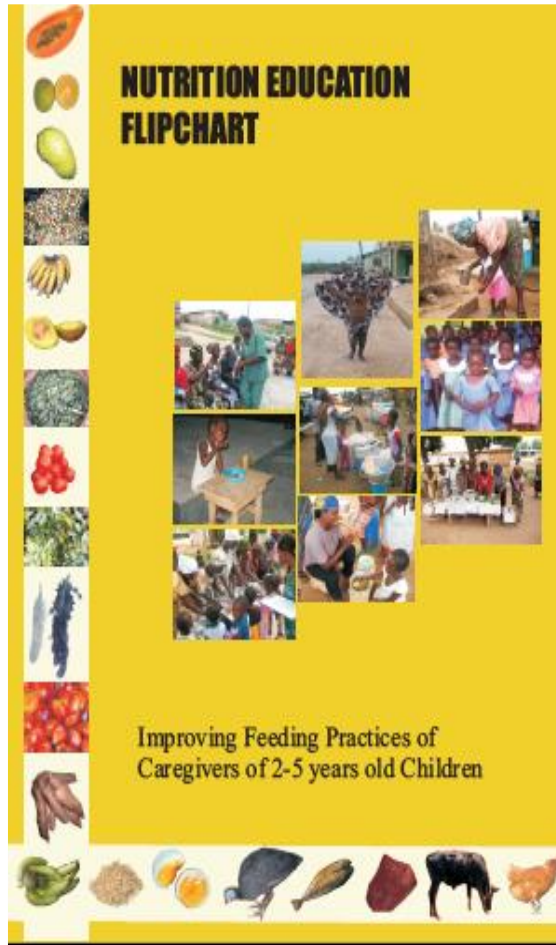
Component 1. Nutrition education

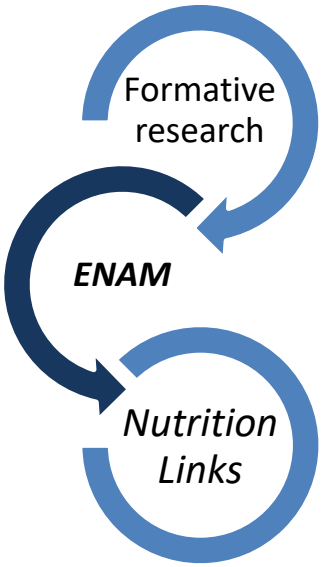
Part of weekly group meeting

Flip charts for group discussion

- Child feeding styles
- Benefits of ASF
- Balanced plate
- Hygiene

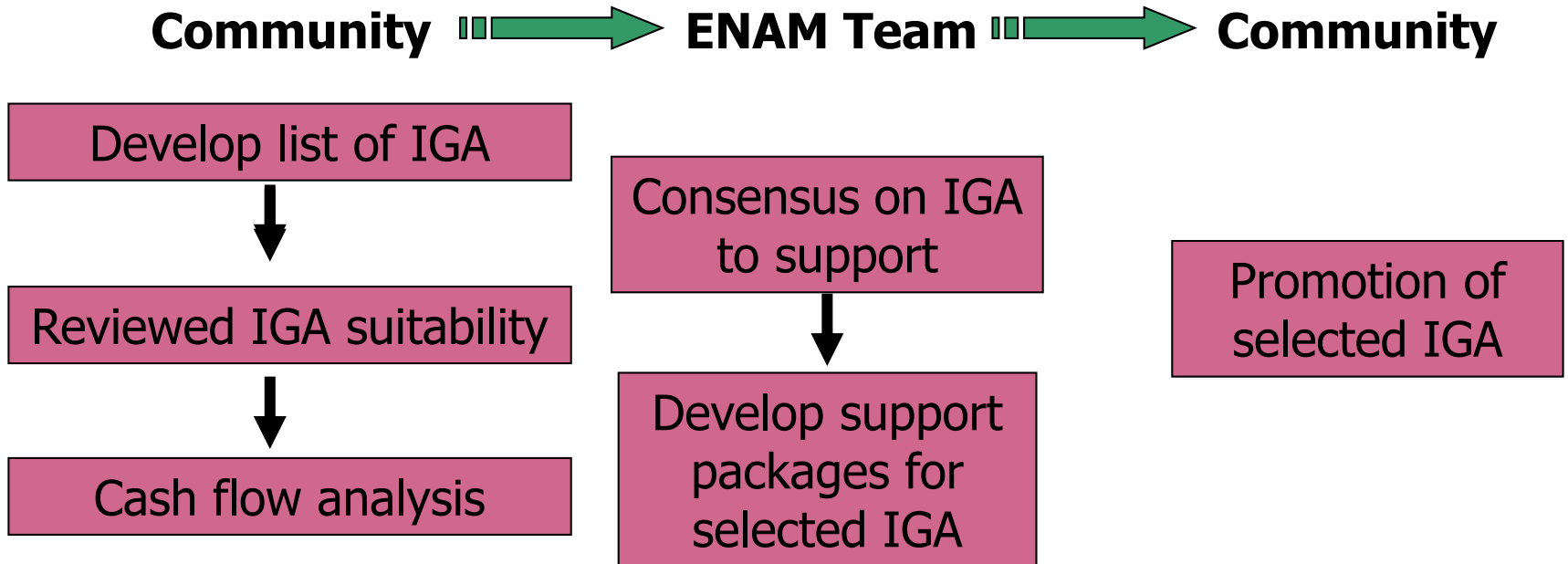
Cooking competition

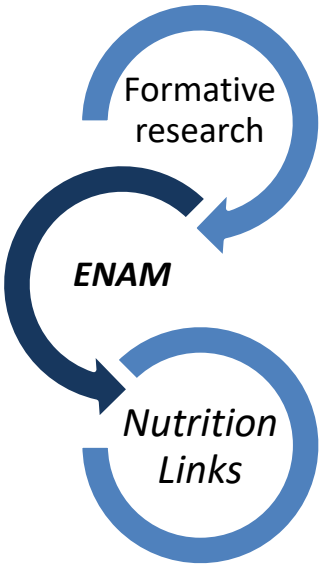




Component 2. Micro-credit loans

Step 1. Selection of income-generating activities (IGA)



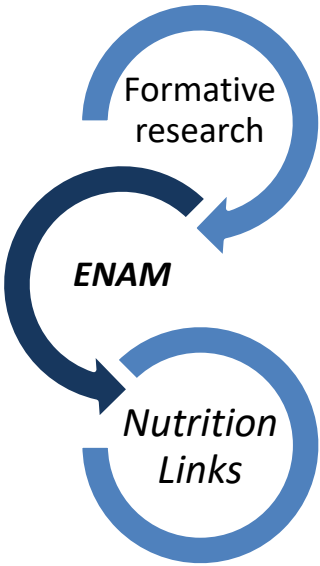


Economic activities

- Types supported
 - Fish smoking
 - Fish selling (fish mongering)
 - Poultry egg production
 - Selling of foodstuffs (yams)
 - Selling of cooked foods
 - Processing & sale of foods (shea butter, rice parboiling)



Step 2. Form loan groups & community associations



Orientation training

Eligible caregivers of pre-school children (3-5/group)

Loan requirements:

- Group concept
- \$50 maximum initially
- Loan cycle (16 wk)
- Repayment weekly
- Savings (10%)
- Education

Future loans require:

- Meeting attendance
- Savings
- Group appraisal

Group self-selection

Solidarity group

Solidarity group

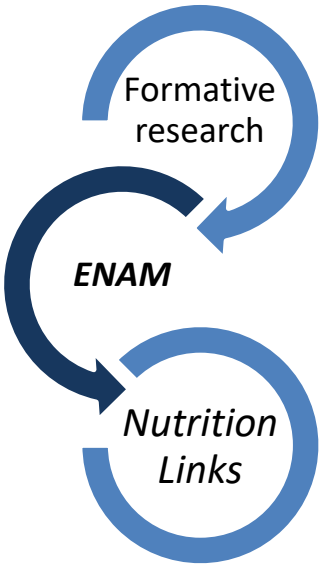
Solidarity group

Solidarity group

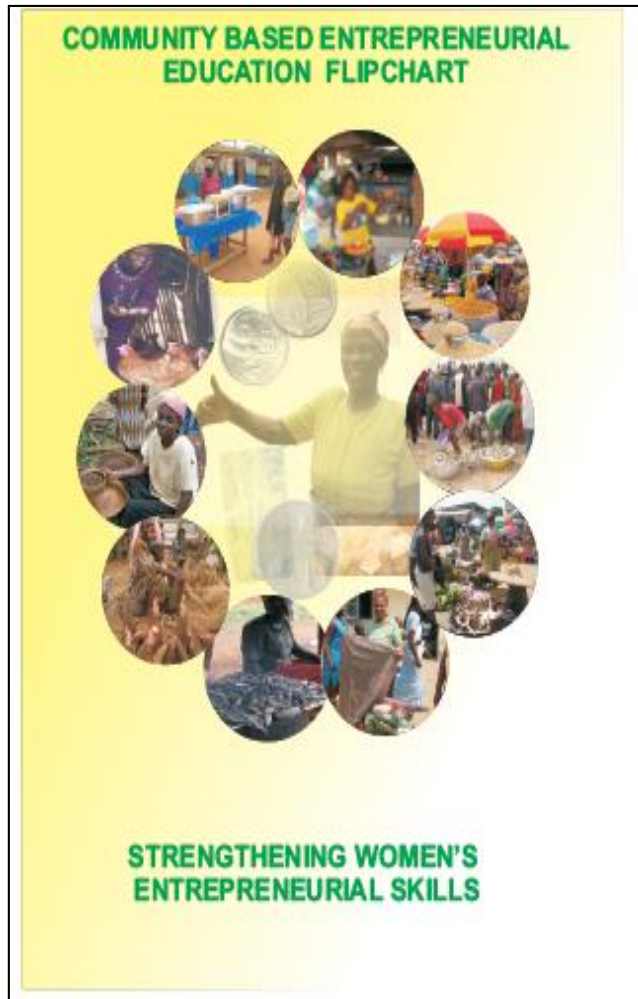
Village Credit & Savings Association (CSA)

CSA leadership
CSA by-laws

Loan appraisal



Component 3. Business education

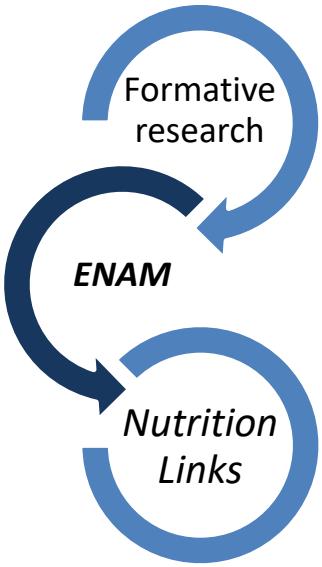


Part of weekly group meeting
Flip charts for group discussion

- Marketing and customer care
- Record keeping
- Financial literacy

Skits on lessons learned





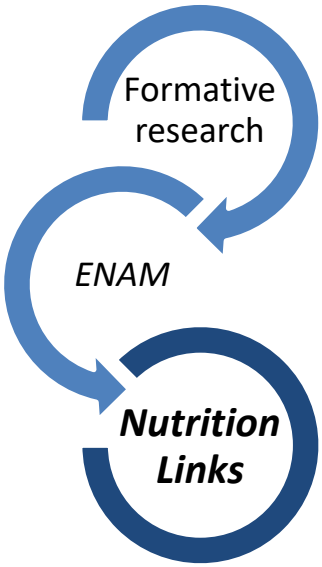
Weekly meetings

- Repay loans
- Build social networks and sense of empowerment
- Address problems
- Provide education

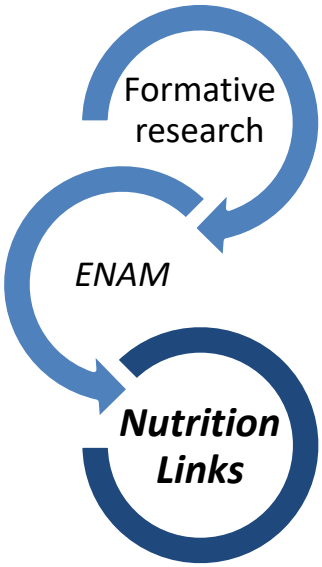


“I know I am doing well and am more successful than other members. I believe in the project. I follow their lessons well and practice most of the things we are taught”.

Nutrition Links project intervention



Building capacity for sustainable livelihoods and health through public-private linkages in agriculture and health systems



Component 1. Nutrition education

Part of weekly group meeting

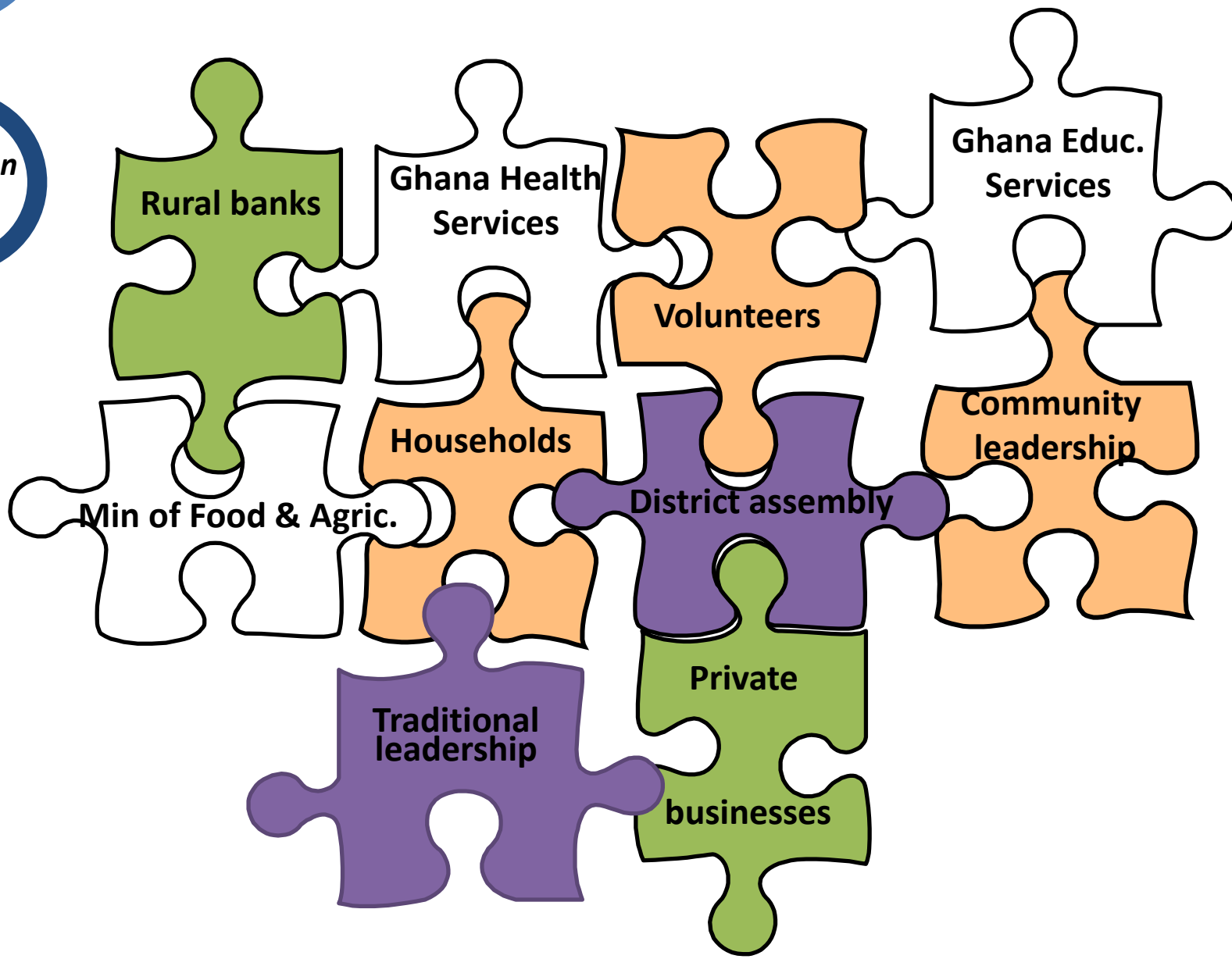
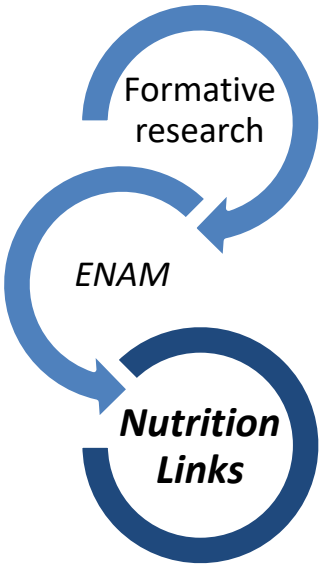
Education focused on nutritional benefits and use of the following in complementary feeding:

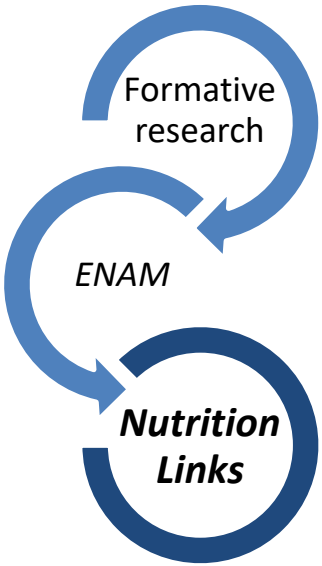
- Eggs
- Produce from home gardens
 - Green leafy vegetables
 - Orange-fleshed sweet potatoes

Cooking demonstrations



Nutrition Links goal included harmonization of nutrition education throughout the district





Additional nutrition education activities

At district level

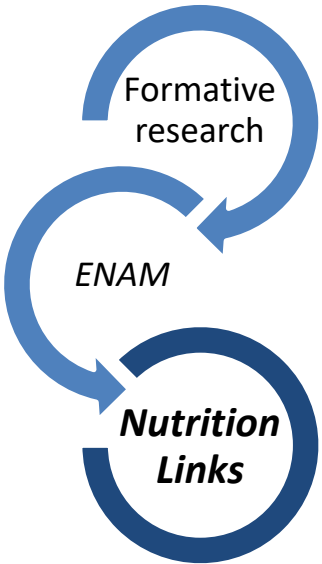
- Government & private industry staff training
- District-wide radio program (post-intervention)



At community level

- Food demonstration sessions





Component 2. Poultry business inputs

Passing-on-the-gift community development approach (Heifer)

Gift

Loan (repaid in-kind)



Poultry

Coop roofing



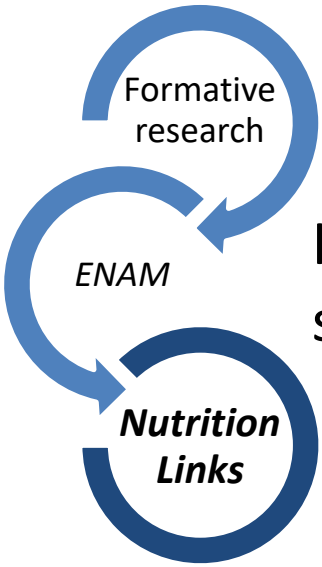
Poultry

30-40 layers
Feed
Medication



Home garden cuttings/seeds

Vegetables
Orange-fleshed sweet potatoes



Component 3. Training on agri-business

Initial training & informally supported in weekly meetings

Processing & marketing

- Eggs
- Garden produce
- Honey (phase 1)

Record keeping

Egg bulking

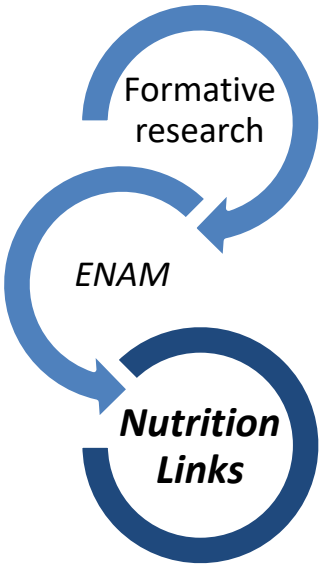


Technical assistance in the community

Demonstration garden visits at the UG Nutrition Research and Training Centre

Encouragement of savings from sales





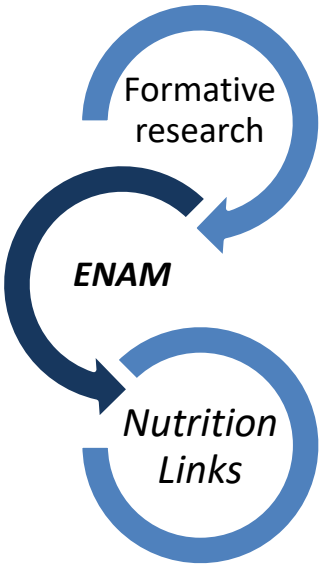
Weekly meetings

- Repay in-kind (eggs monetarized)
- Build social networks and sense of empowerment
- Address any production problems
- Provide education

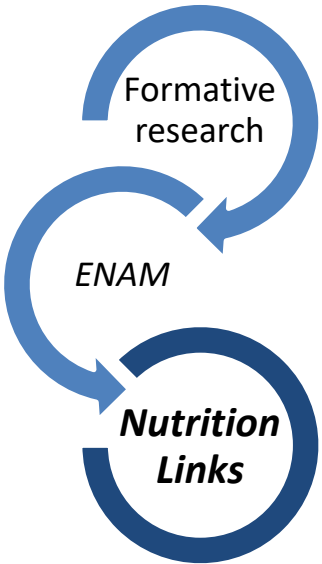


Baseline results comparing study groups

ENAM



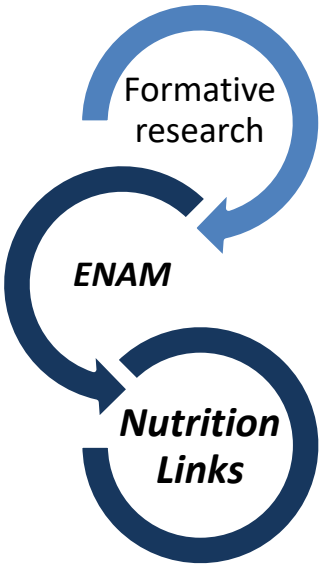
Factor	Intervention	Internal comparison	External comparison	<i>P</i>
Household				
High food insecure	25%	30%	37%	0.02
Caregiver				
Migrant	53%	68%	47%	0.001
Trader	77%	56%	38%	0.001
GHc/wk	6.0(0,12.0)	3.5(0,10.5)	3.0(0,11.0)	0.001
Child				
Age (mo)	38.8(10.4)	43.1(11.3)	43.6(12.2)	0.001
Weight-for-age, Z	-0.84(0.96)	-0.95(0.97)	-1.06(0.97)	0.05
Height-for-age, Z	-1.32(1.38)	-1.34(1.15)	-1.43(1.21)	0.62
ASF diversity, #	5.1(2.0)	4.6(2.2)	4.7(2.2)	0.04
ASF(#/wk)	15.2(7.1)	14.0(7.7)	12.7(7.0)	0.001



Baseline results comparing study groups

Nutrition Links

Factor	Intervention	Control	<i>P</i>
Household			
Low wealth	33%	33%	0.93
Caregiver			
No formal education	25%	19%	0.17
Child			
Age (mo)	10.5(5.2)	10.4(5.1)	0.85
Weight-for-age, Z	-0.78(1.12)	-0.68(1.27)	0.34
Length-for-age, Z	-0.88(1.27)	-0.78(1.30)	0.39
Minimal diverse diet	31%	34%	0.55
Eggs in past week	25%	22%	0.38

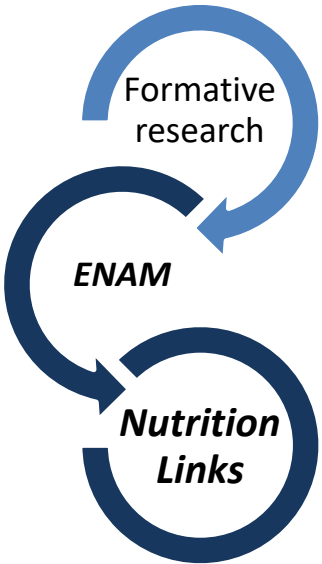


Results

Difference in diet indicators, intervention

Indicator	Intervention difference	<i>p</i> or (95% CI)	Project
Household ASF consumption last week (monetized purchased + not purchased)	+ 5.1 USD (14.8 vs 9.7)	0.001	ENAM ¹
Increased cultivation of promoted dark green leafy vegetables	+ 10 % pts (27% vs 17%)	0.05	NL
Cultivated at least one nutrient-rich promoted crop	aOR=2.11	(1.43, 3.10)	NL
Child consumed egg in last 24 h (only those with inputs)	aOR=1.59	(0.98, 2.59)	NL ²
Child had a minimally diverse diet (≥ 4 food groups)	aOR=1.65	(1.02, 2.69)	NL ²

¹Homiah PA et al. *AJFAND* 2012; ²Marquis et al. *Matern Child Nutr* 2018
 Food groups: grains; roots and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin-A-rich fruits and vegetables; and other fruits and vegetables (World Health Organization 2008). NL: Nutrition Links



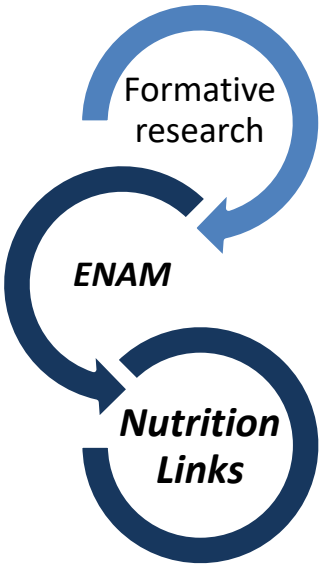
Results

Difference in diet indicators, other predictors

Other factors / Indicator	Difference	<i>p</i>	Project
Caregiver has ASF-related business			
ASF consumed by child last 7 d, # times	<i>b</i> = +0.5	<0.01	ENAM ¹
Caregiver's nutrition knowledge/attitudes			
ASF consumed by child last 7 d, # times	<i>b</i> = +0.24 (0.08)	<0.01	ENAM ²
Child's ASF diversity last 7 d, # types	<i>b</i> = +0.51 (0.02)	<0.001	ENAM ²
Household dietary diversity last 7 d, # types	<i>b</i> = +0.13 (0.04)	<0.01	ENAM ²

¹ Christian et al. *AJFAND* 2012; ² Christian et al. *Br J Nutr* 2017

ASF types: livestock meats, organ meats/offal, game animals, whole fish, fish powder, shellfish, snails, poultry, eggs, milk/milk products



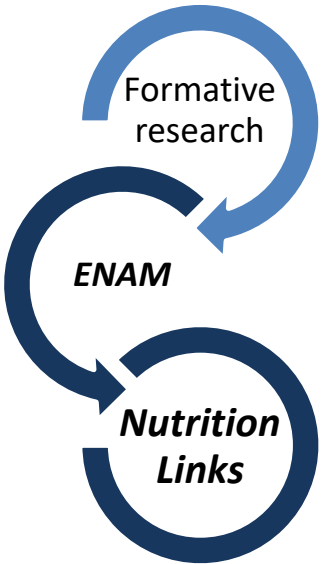
Women's voices on children's diets

“Before the project, I would sell all the fish because I wanted the money. But now, I make sure there is always some fish left at home for them [the children]”

(project participant, *ENAM*)

“Because of [the garden] we did not eat only one-way food. Mmm [smiling] like eating banku every day, eating banku everyday, we don't eat like that. [smiling]”

(project participant, *Nutrition Links*)



Results

Difference in nutritional status indicators, intervention

Indicator	Intervention difference	<i>P or (95% CI)</i>	Project
Weight-for-age, Z score	+ 0.28	0.05	ENAM ¹
	+0.15	(0.00, 0.30)	NL ²
Height-for-age, Z score	+0.19	0.05	ENAM ¹
	+0.22	(0.09, 0.34)	NL ²

¹ Marquis et al. *J Nutr* 2015; ² Marquis et al. *Matern Child Nutr* 2018
 NL: Nutrition Links

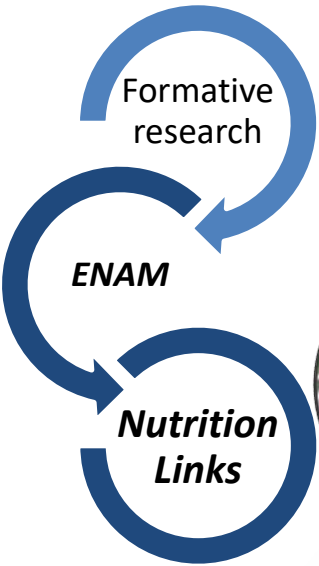
Results: Difference in nutritional status indicators, other predictors

Other factor/Indicator	Difference	<i>p</i>	Project
Household children < 5 y, #			
Weight-for-age, Z	<i>b</i> = -0.11 (0.05)	<0.05	ENAM ¹
Height-for-age, Z	<i>b</i> = -0.22 (0.06)	<0.05	ENAM ¹
Mother (migrant)			
Weight-for-age, Z	<i>b</i> = -0.15 (0.06)	<0.05	NL ²
Height-for-age, Z	<i>b</i> = -0.18 (0.05)	<0.01	NL ²
Male child			
Height-for-age, Z	difference = -0.28	<0.01	ENAM ¹
	<i>b</i> = +0.19 (0.04)	<0.01	NL ²
Ecological region (Forest Transition vs Guinea Savannah)			
Height-for-age, Z	Difference = -0.29	<0.05	ENAM ¹

¹ Christian et al. *Br J Nutr* 2017); ² Marquis et al. *Matern Child Nutr* 2018;NL: Nutrition Links

¹ Marquis et al. *J Nutr* 2015; ² Marquis et al. *Matern Child Nutr* 2018

NL: Nutrition Links



Common project components



- Outcome of interest was child nutrition



- Rural women with young children



- Activities based on formative research & lessons learned



- Meetings weekly



- Group dynamics for education; reinforced



- Agricultural training in the community



- Inputs or cash included



- Assistance with markets

In summary,

Interventions that provide women with training, economic resources, and social support can help women build agriculture-based small businesses.

Children's intake of ASF is linked to the mother having an ASF-based business and having the nutrition knowledge about appropriate complementary feeding.

Together, interventions that address knowledge and resource gaps contribute to improving child growth





The frequent social interactions also improves the lives of women who report ...

- improved relationships with customers and others
- public speaking and teaching abilities
- enhanced self-confidence
- perceived independence and value (*I have a voice now*)

ENAM

Iowa State University

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World Vision International: B Aidam

World Vision Ghana: R Owusu

Heifer Ghana: R Kanlisi

Farm Radio International: B Fiafor

Steering Committee

Traditional leaders, district-level
government representatives, rural bank
representative, community representatives,
& project staff





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