IFPRI

Multi-sectoral approaches to improve nutrition outcomes

An evidence synthesis on nutrition-sensitive agriculture programs

Based on work by Deanna Olney, Aulo Gelli, Amy Amrgolies, Ara Go, Neha Kumar, Carol Levin, Chris Kemp, Esther Choo, Harold Alderman .
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Background

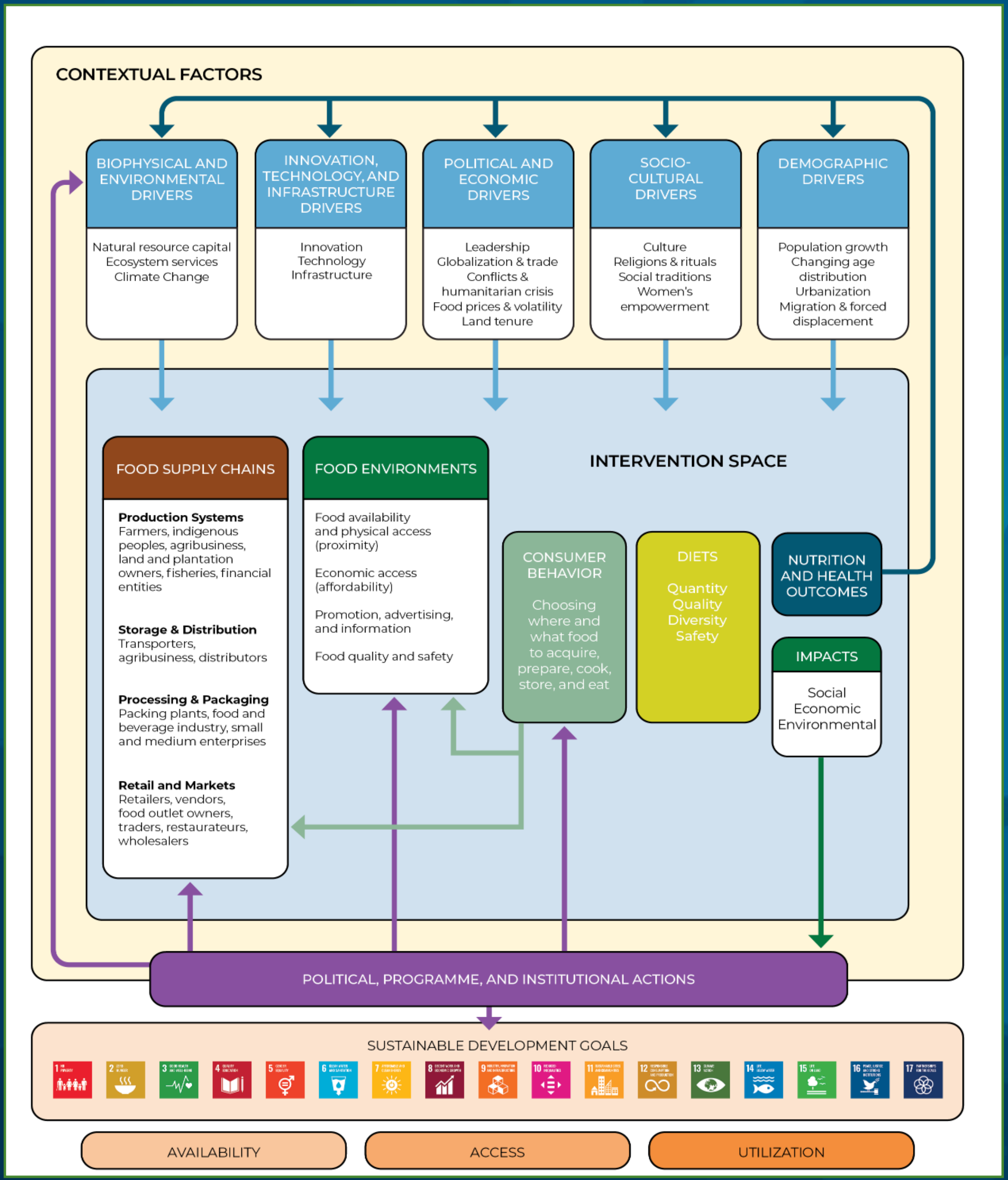
- Estimates of the global burden of disease have attributed 20% of deaths to unhealthy diets
- Multi-sectoral nutrition-sensitive programs aim to address the determinants of nutrition and include nutrition-focused goals or strategies
- Integrated agriculture and nutrition interventions have been found to consistently increase household access to nutritious foods leading to improvements in the diets of women and young children
  - Design and implementation is very heterogeneous
  - There is a need to better understand links between design, implementation and effectiveness

Objectives

- Provide an overview of linkages between nutrition sensitive programs and nutrition outcomes from a food system framing
- Summarise evidence and evidence gaps on integrated agriculture and nutrition programs on nutrition outcomes
    - Literature review focusing on child nutrition outcomes
    - Meta-analysis on children's dietary diversity
    - Highlight areas where more evidence is needed…
- Based on work developed in partnership with the University of Washington, FAO, Nutrition International and WFP

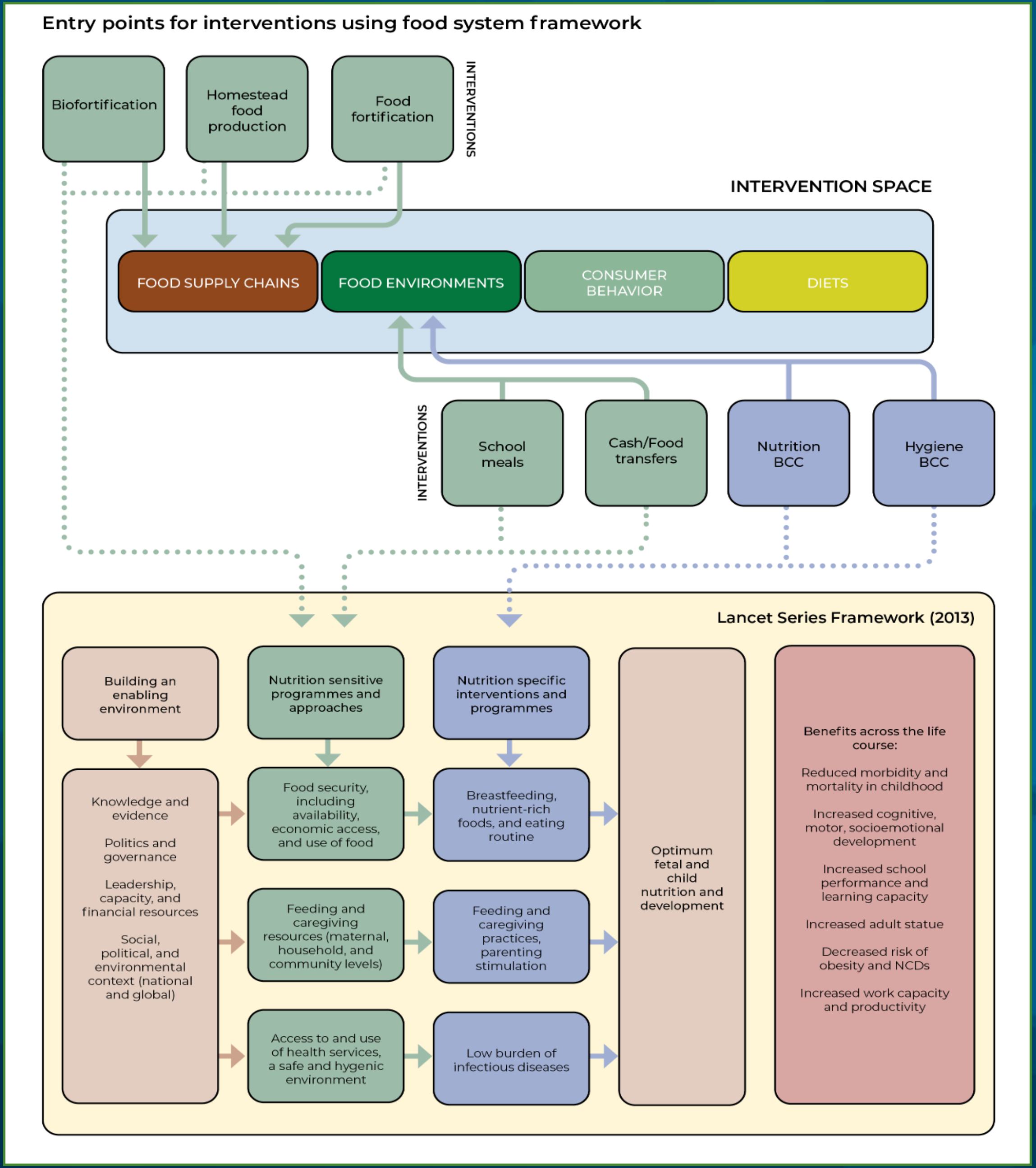
Food systems framing

- Food systems include all activities, resources, and infrastructure involved in food production, processing, transport, marketing, consumption, and disposal (HLPE 2017)
- Framing within food systems allows for a broader view of both the potential entry points for interventions and for examination of the potential second-order effects and feedback loops



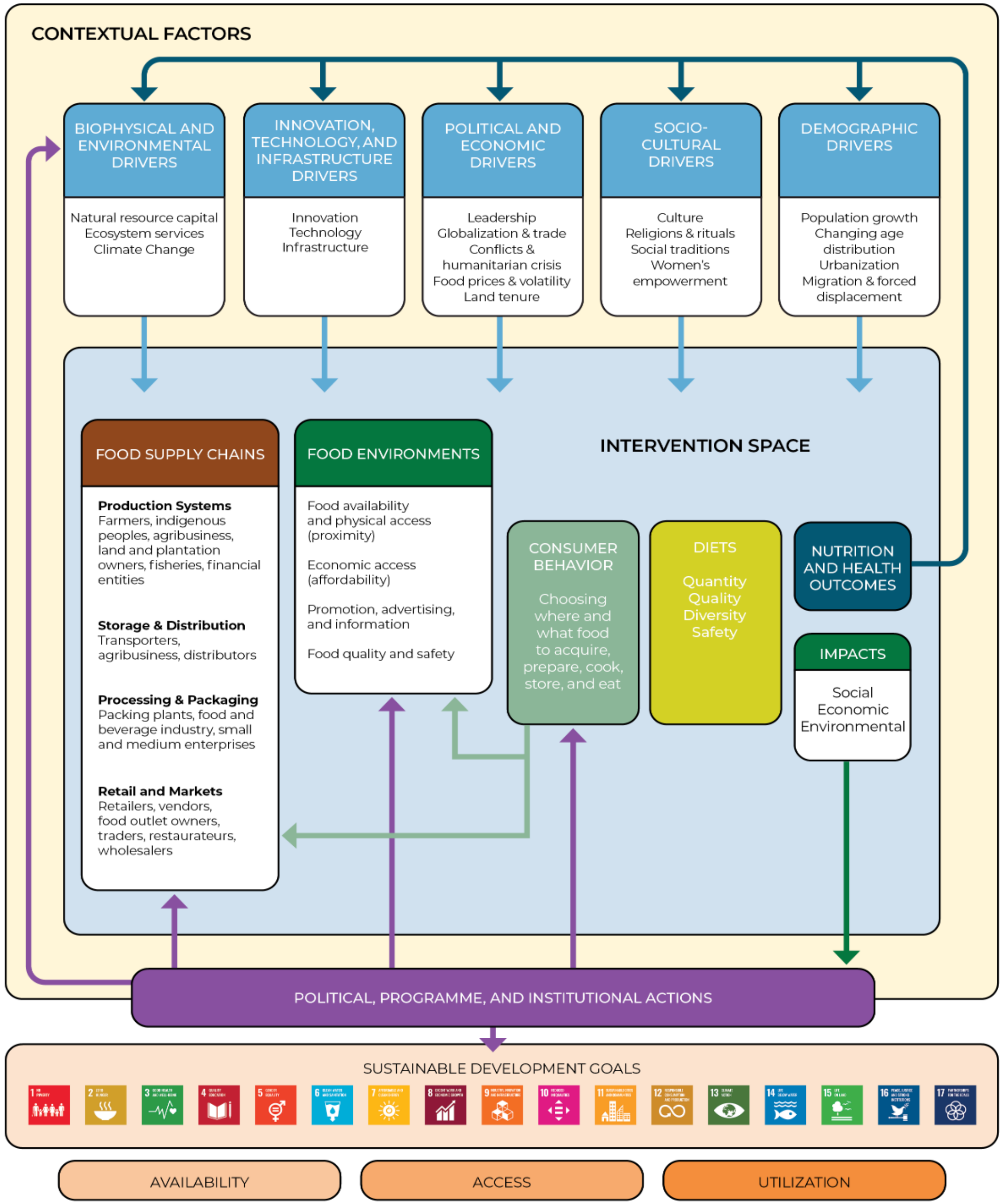
Unpacking links to nutrition

- Overlay HLPE and Lancet Series in 2013 frameworks to allows for a more linear perspective on the results of the intervention (Black et al. 2013)

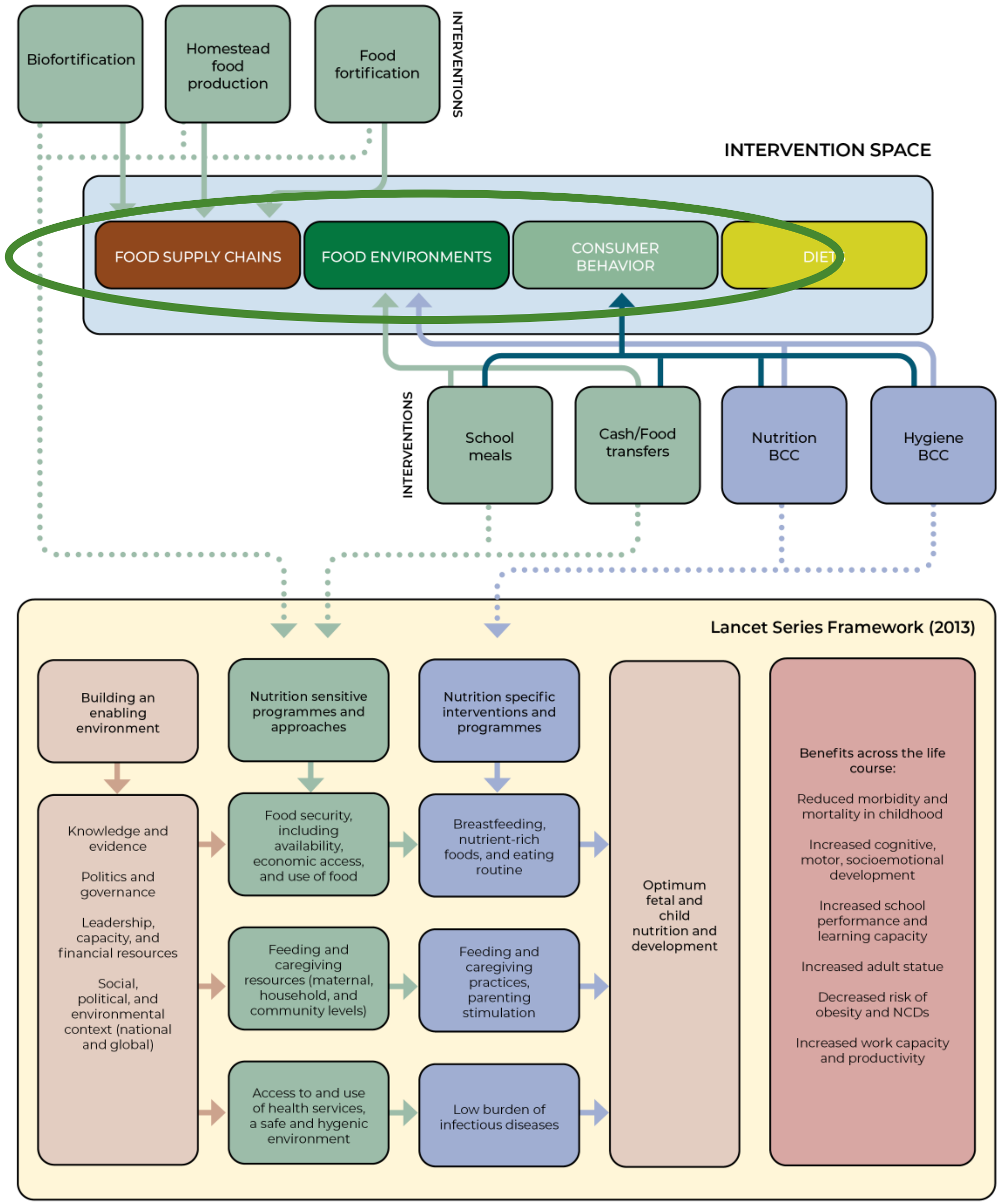


Source: http://www.fao.org/3/a-i7846e.pdf

Conceptual Framework



Entry points for interventions using food system framework



Source: http://www.fao.org/3/a-i7846e.pdf

Nutrition sensitive agriculture programs and child nutrition outcomes

- Literature review findings

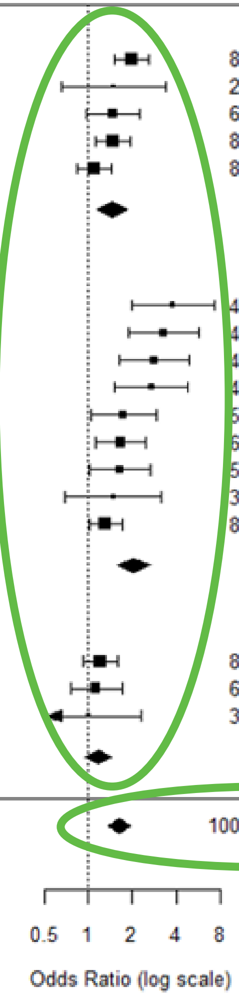
	Dietary indicators		Anthropometric measures							Biochemical assessments		
	Diversity	MN Intake	Birth weight	LBW	HAZ	Stunting	WHZ/ BMI	Wasting/ thinness	Overweight	Vit. A	Hb	Anemia
Measured[1]	6/15	4/15	0	0	9/15	7/15	10/15[4]	7/15	0	0	3/15	5/15
Positive[2]	4/6	2/4	-	-	3/9	1/7	4/10[4]	3/7	-		2/3	1/5
Neutral[2]	4[3]/6	2/4	-	-	8/9	6/7	7/10[4]	4/7	-		1/3	4/5
Negative[2]	0/6	0/4	-	-	0/9	0/7	0/10	0/5	-		0/3	0/5

[1] The numerator in the "Measured" row represents the number of treatment groups where effects on the specific indicator was reported. The denominator is the number of treatment groups where comparisons were made. [2]The numerator in the "Positive," "Neutral," and "Negative" rows represents the number of comparisons in which the result was either positive, neutral or negative. The denominator is the total number of treatment groups for which the comparison was made (i.e. the numerator in the "Measured" row). [3]In the Ethiopian study the comparison across two treatment groups found positive effect in program with the inclusion of a BCC intervention relative to the program with chickens alone, but not compared to control group. [4]in the Zambia study, one of the treatment groups had both positive and neutral effects so is counted for both positive and neutral impacts. For diet diversity, HAZ and WHZ columns some treatment arms had mixed results (positive and null, depending on subgroups) which were counted as both positive and neutral, leading to sub-column totals that don't add up to total studies that measured these outcomes.

Meta-analysis: Children's minimum dietary diversity (6-23.9 months)

First Author, Year	Country	Design	Age	Arm	ASF Inputs	Sample Size	Weight	Odds Ratio [95% CI]
Agriculture + BCC vs. Agriculture								
Kuchenbecker, 2017	Malawi	cRCT	6-23mo		No	959	8.31%	1.97 [1.51, 2.58]
Passarelli, 2020	Ethiopia	cRCT	6-23mo	ACGG/ATONU vs. ACGG	Yes	113	2.99%	1.48 [0.65, 3.37]
Passarelli, 2020	Ethiopia	cRCT	24-60mo	ACGG/ATONU vs. ACGG	Yes	407	6.52%	1.47 [0.98, 2.21]
Reinbott, 2016	Cambodia	cRCT	6-23mo		No	922	8.31%	1.46 [1.12, 1.91]
Kumar, 2018	Zambia	cRCT	6-24mo	Ag-G-BCC vs. Ag-G	Yes	834	8.19%	1.09 [0.83, 1.44]
RE Model for Subgroup (Q = 9.10, df = 4, p = 0.06; I^2 = 56.7%)								1.47 [1.16, 1.86]
Agriculture + BCC vs. Control								
Low, 2007	Mozambique	QE	24-60mo		No	741	4.09%	3.80 [1.98, 7.29]
Olney, 2015	Burkina Faso	cRCT	27-40mo	HC	Yes	538	4.85%	3.28 [1.87, 5.75]
Boedecker, 2019	Kenya	cRCT	6-23mo		No	377	4.98%	2.83 [1.64, 4.90]
Olney, 2015	Burkina Faso	cRCT	27-40mo	OWL	Yes	527	4.69%	2.71 [1.52, 4.85]
Gelli, 2018	Malawi	cRCT	18-36mo		Yes	374	5.31%	1.74 [1.04, 2.91]
Passarelli, 2020	Ethiopia	cRCT	24-60mo	ACGG/ATONU	Yes	433	6.60%	1.67 [1.12, 2.49]
Marquis, 2018	Ghana	cRCT	12-30mo		Yes	354	5.62%	1.65 [1.02, 2.68]
Passarelli, 2020	Ethiopia	cRCT	6-23mo	ACGG/ATONU	Yes	133	3.38%	1.48 [0.69, 3.15]
Kumar, 2018	Zambia	cRCT	6-24mo	Ag-G-BCC	Yes	931	8.34%	1.32 [1.01, 1.71]
RE Model for Subgroup (Q = 19.91, df = 8, p = 0.01; I^2 = 58.1%)								2.04 [1.58, 2.63]
Agriculture vs. Control								
Kumar, 2018	Zambia	cRCT	6-24mo	Ag-G	Yes	899	8.25%	1.20 [0.92, 1.58]
Passarelli, 2020	Ethiopia	cRCT	24-60mo	ACGG	Yes	450	6.57%	1.13 [0.76, 1.69]
Passarelli, 2020	Ethiopia	cRCT	6-23mo	ACGG	Yes	124	3.00%	1.00 [0.44, 2.28]
RE Model for Subgroup (Q = 0.21, df = 2, p = 0.90; I^2 = 0.0%)								1.17 [0.94, 1.45]
RE Model (Q = 40.49, df = 16, p = 0.00; I^2 = 63.3%)							100.00%	1.64 [1.38, 1.94]

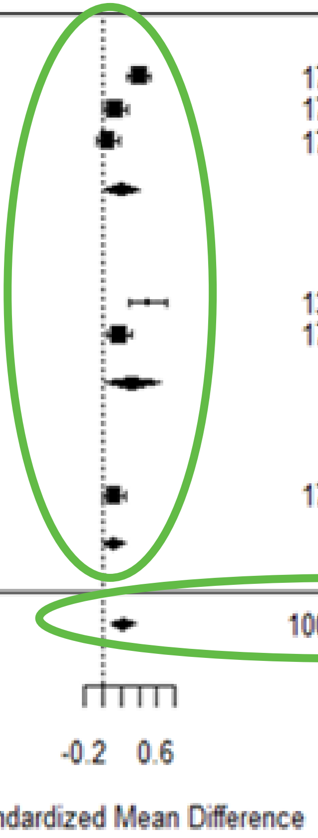
Test for Subgroup Differences: Q_M = 7.70, df = 2, p = 0.02



Meta-analysis: Children's dietary diversity (6-23.9 months)

First Author, Year	Country	Design	Arm	ASF Inputs	Sample Size		SMD [95% CI]
Agriculture + BCC vs. Agriculture							
Kuchenbecker, 2017	Malawi	cRCT		No	959	17.40%	0.40 [0.28, 0.53]
Reinbott, 2016	Cambodia	cRCT		No	921	17.29%	0.13 [0.00, 0.26]
Kumar, 2018	Zambia	cRCT	Ag-G-BCC vs. Ag-G	Yes	834	17.05%	0.06 [-0.08, 0.19]
RE Model for Subgroup (Q = 15.10, df = 2, p = 0.00; I^2 = 86.6%)							0.20 [-0.01, 0.41]
Agriculture + BCC vs. Control							
Boedecker, 2019	Kenya	cRCT		No	377	13.67%	0.50 [0.29, 0.71]
Kumar, 2018	Zambia	cRCT	Ag-G-BCC	Yes	931	17.35%	0.18 [0.05, 0.31]
RE Model for Subgroup (Q = 6.44, df = 1, p = 0.01; I^2 = 84.5%)							0.33 [0.02, 0.64]
Agriculture vs. Control							
Kumar, 2018	Zambia	cRCT	Ag-G	Yes	899	17.24%	0.12 [-0.01, 0.25]
RE Model for Subgroup (Q = 0.00, df = 0, p = 1.00; I^2 = 0.0%)							0.12 [-0.01, 0.25]
RE Model (Q = 24.31, df = 5, p = 0.00; I^2 = 81.5%)						100.00%	0.22 [0.09, 0.36]

Test for Subgroup Differences: Q_M = 0.84, df = 2, p = 0.66



Key take-aways

1. Nutrition sensitive agriculture programs can be used to improve diets in children (and in women)
2. Nutrition sensitive programs are more likely to improve intermediary outcomes than nutritional status outcomes
    - This could be due to timing and duration of the program, modality of incentive, alignment of program interventions to the nutritional problems, or need for additional program components
3. The heterogeneity of program and evaluation designs
    - To clearly understand which program design features are most important for achieving impacts, consistency in program and evaluation design across several programs in different contexts is needed.

Thank you!

- Based on:

Olney DK, Gelli A, Kumar, N, Alderman, H, Go A, Raza A, Owens J, Grinspun A, Bhalla G, and Benammour O. 2021. Nutrition-sensitive social protection programs within food systems. IFPRI Discussion Paper 2044. Washington, DC: International Food Policy Research Institute (IFPRI); and Food and Agricultural Organization of the United Nations (FAO).

Margolies A, Kemp C, Choo E, Levin C, Olney D, Kumar N, Go A, Alderman H, Gelli A. Nutrition-sensitive agriculture programs increase dietary diversity in children under 5 years: A review and meta-analysis. Accepted, Journal of Global Health.