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# Applying Cost-Effectiveness in Research for Food Aid and Nutrition Programming: Methods and Policy Applications

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June 27, 2018

Food Assistance for Nutrition Evidence Summit  
Washington D.C.

Please cite this presentation as:

Rogers B and Lelijveld N. Applying Cost-Effectiveness in Research for Food Aid and Nutrition Programming: Methods and Policy Applications. PowerPoint slides presented at the Food Assistance for Nutrition Evidence Summit, Washington, District of Columbia, USA. June 27-28, 2018.

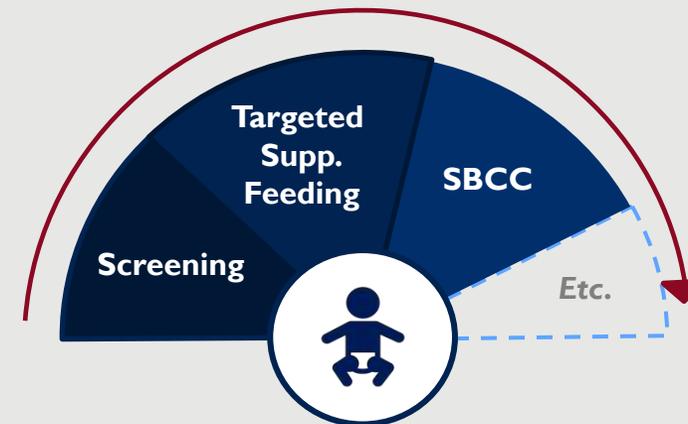
# Determining our unit cost and cost effectiveness is a top priority for the WFP's Nutrition division this year

## What does it cost to treat a child for MAM? What about a PLW?

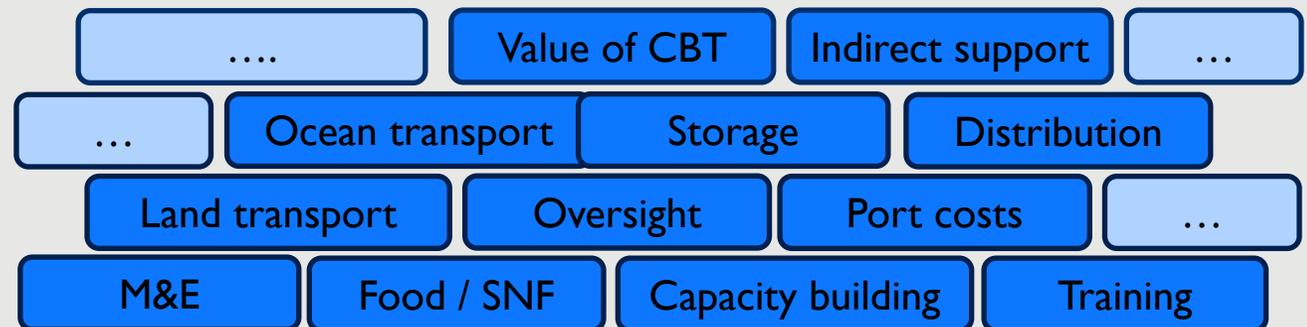
- What are the major cost drivers?
- How does the unit cost differ by context and why?
- What is the incremental cost of adding additional interventions alongside the provision of SNFs?

- Developing a standardized tool
- Refining the framework, utilizing existing tools and data
- Piloting in key countries using WFP programs and data

*Considered in terms of our interventions....*



*....and types of cost*



# Introducing our Panelists

## Beatrice Rogers

Professor of Economics and Food Policy; and Director, Division of Food Policy and Applied Nutrition  
*Tufts University*

“FAQR Cost-Effectiveness Research: Methods, Results & Lessons Learned”

## Stephen Vosti

Adjunct Professor  
*University of California, Davis*

“Lessons from the iLiNS, MINIMOD, & SPRING Projects”

## Natasha Lelijveld

Research Fellow  
*Centre for Global Child Health, Hospital for Sick Children, Toronto*

“Considerations for Calculating Cost-Effectiveness of Community Management of Acute Malnutrition (CMAM) Programs”

## Deanna Olney

Senior Research Fellow and Co-Theme Leader for Nutrition-Sensitive Programs  
*IFPRI*

“Cost Study of the Preventing Malnutrition in Children under 2 Years of Age Approach in Burundi and Guatemala”



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[Applying Cost-Effectiveness in Research for Food Aid and Nutrition Programming: Methods and Policy Applications]

**Food Aid Quality Review (FAQR)  
Cost-Effectiveness Research:  
Methods, Results & Lessons Learned**

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June 27, 2018

Food Assistance for Nutrition Evidence Summit

Washington D.C.

Beatrice Rogers

# — Presentation Outline

- Overview of two FAQR field studies and the methods used to assess cost-effectiveness
- Lessons Learned from FAQR cost-effectiveness research



**Are we spending public money wisely in selecting and delivering food assistance for greatest impact?**

# Two FAQR Field Studies to study the Comparative Cost-Effectiveness of Four Specialized Nutritious Foods in Food Aid & Nutrition Programming:

**Arm 1  
CSB+:**

**Corn Soy  
Blend Plus**



**Arm 2  
CSWB:**

**Corn Soy  
Whey Blend**



**Arm 3  
SC+:**

**SUPER  
CEREAL plus**

**Arm 4  
RUSF:**

**RUSF**  
Ready-to-Use Supplementary Food

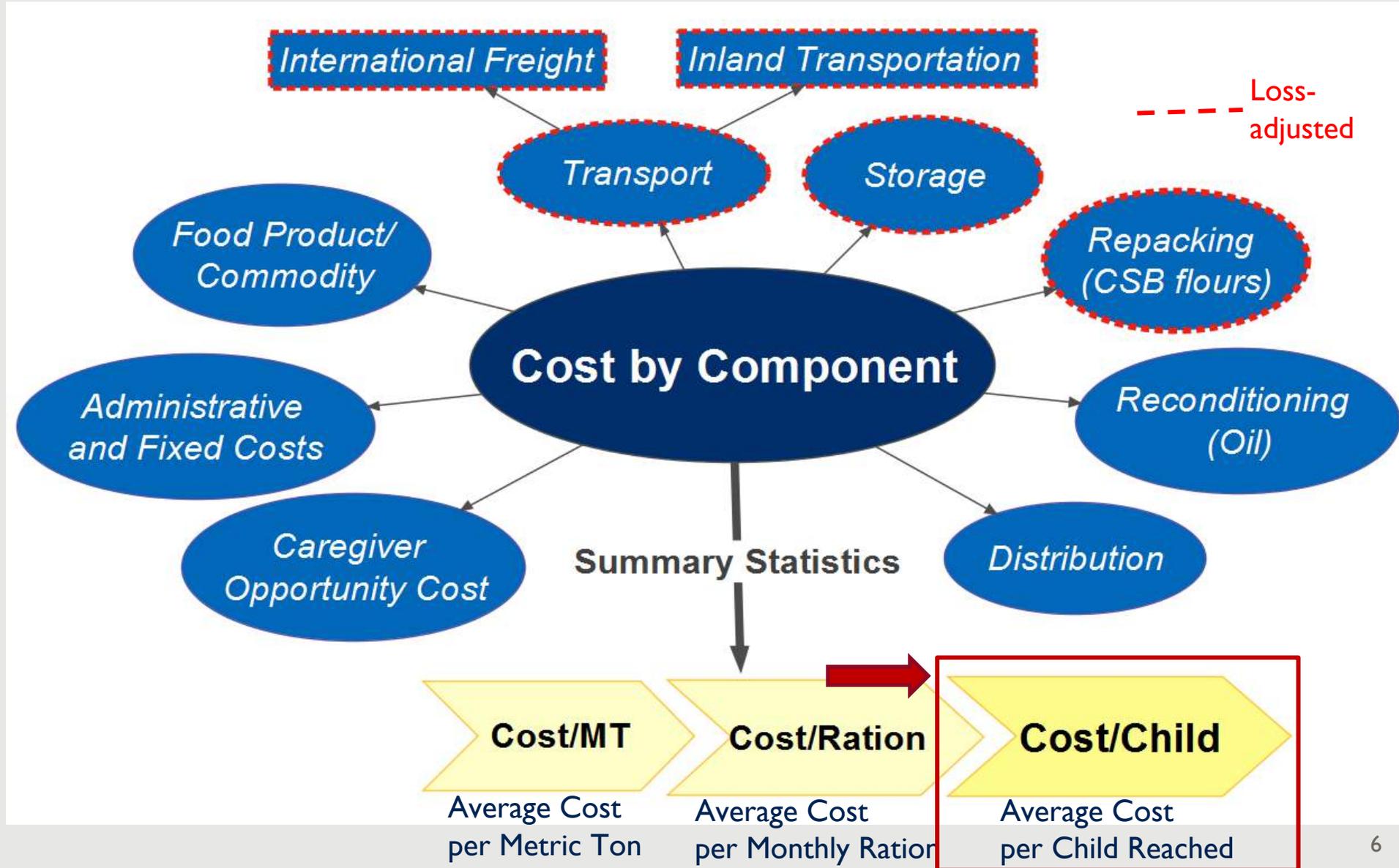
- Burkina Faso Study
  - Blanket Supplementary Feeding
  - Prevention of Stunting and Wasting
  - Completed
- Sierra Leone Study
  - Targeted Supplementary Feeding
  - Treatment of Moderate Acute Malnutrition (MAM)
  - Ongoing

# Costing Methods: Activity Based Costing- Ingredients Approach

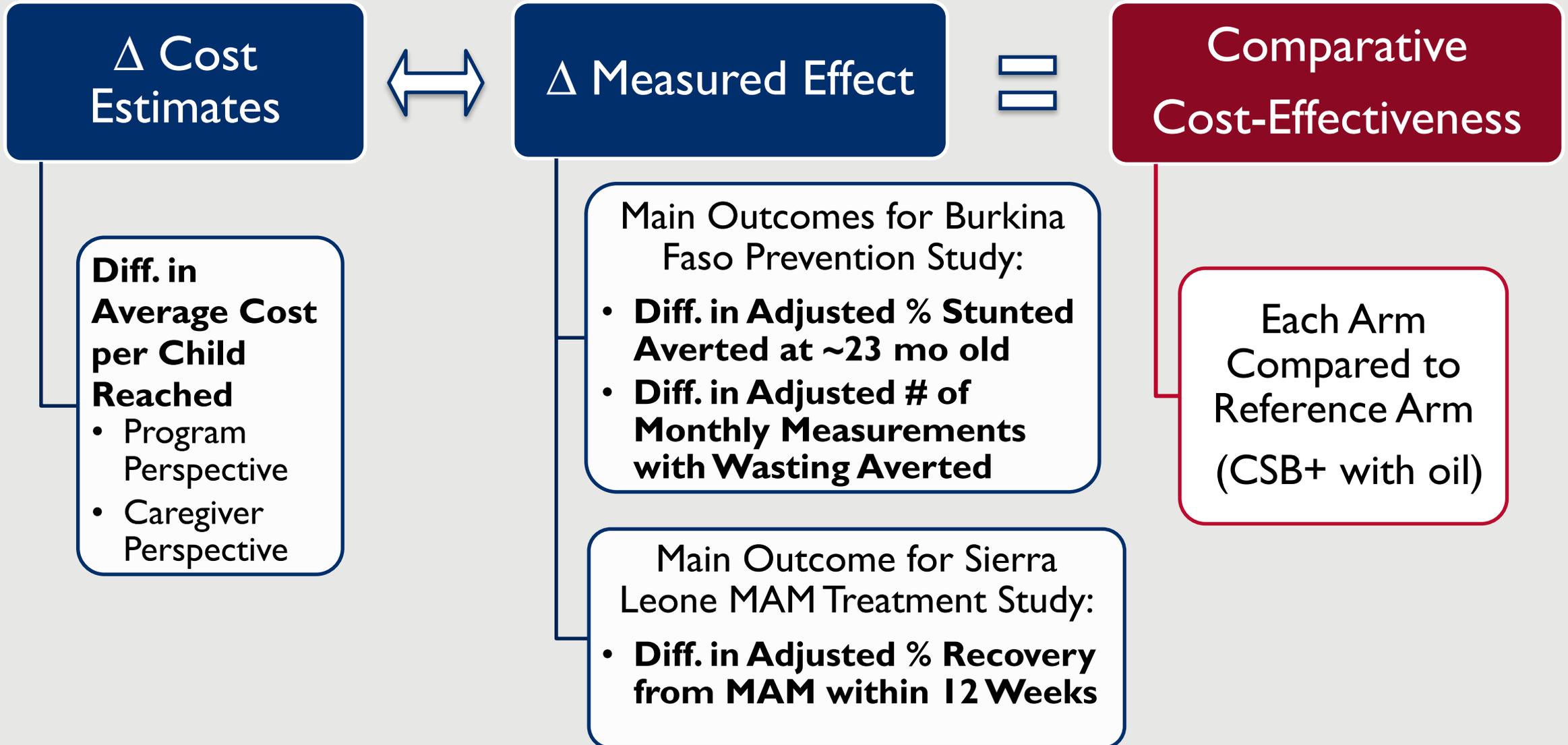
Cost Matrix Example (Burkina Faso Prevention Study)



Cost per Child Reached Linked with Effectiveness Outcomes to Assess Cost-Effectiveness



# Cost-Effectiveness Analysis Methods to Compare Across Arms

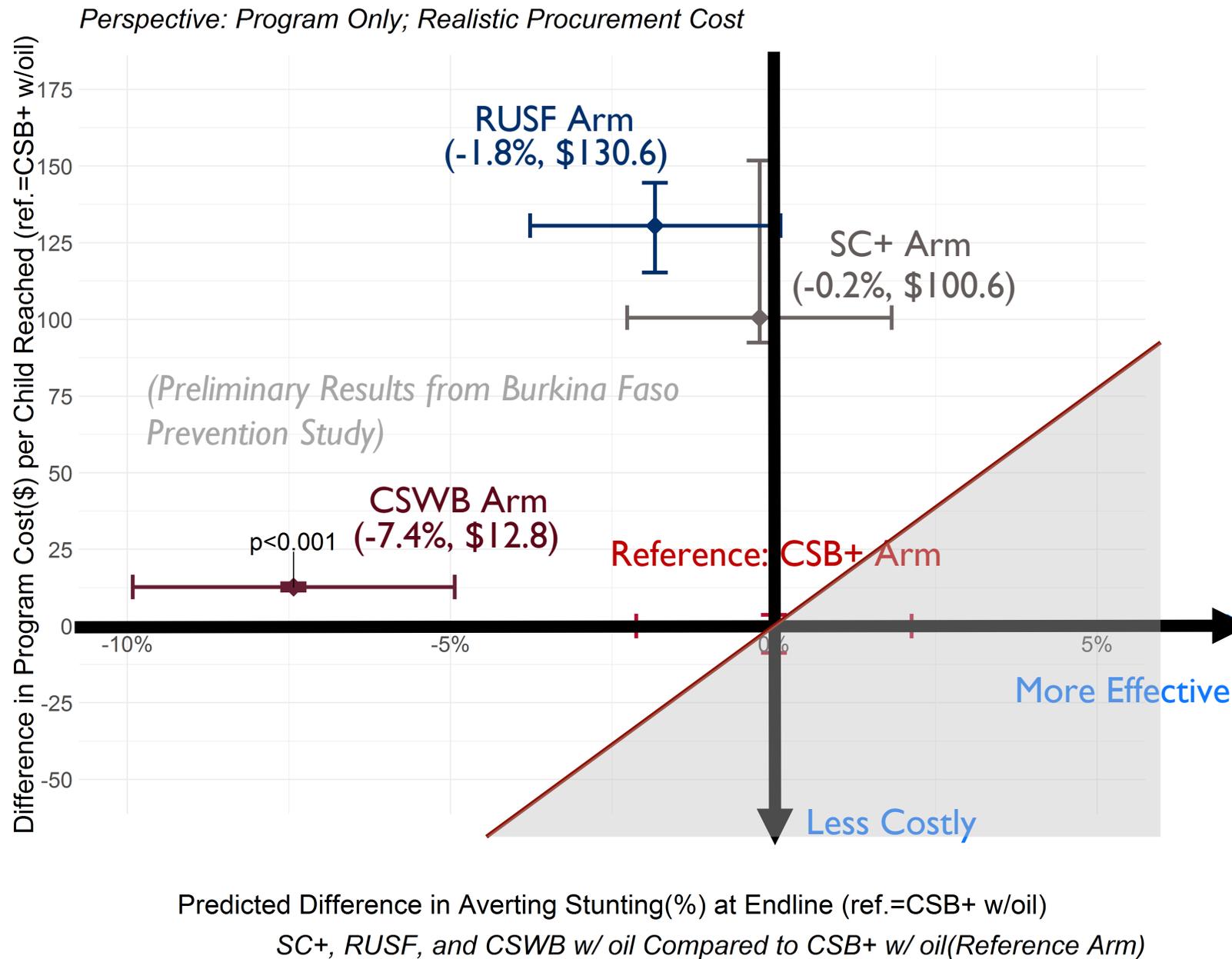




**Lesson 1:**  
**Why Cost-Effectiveness Research**

- Policy decisions depends crucially on cost-effectiveness evidence. Robust cost *and* impact estimates are needed to make better food assistance programming and policy decisions.

# Incremental Cost-Effectiveness Plane for Stunting Prevention





## Lesson 2:

### Valuing Opportunity Cost

- Caregiver time is not “free” even though not paid by the program
- Including caregivers’ perspective could affect relative cost-effectiveness rankings.
- How we value caregiver time matters.

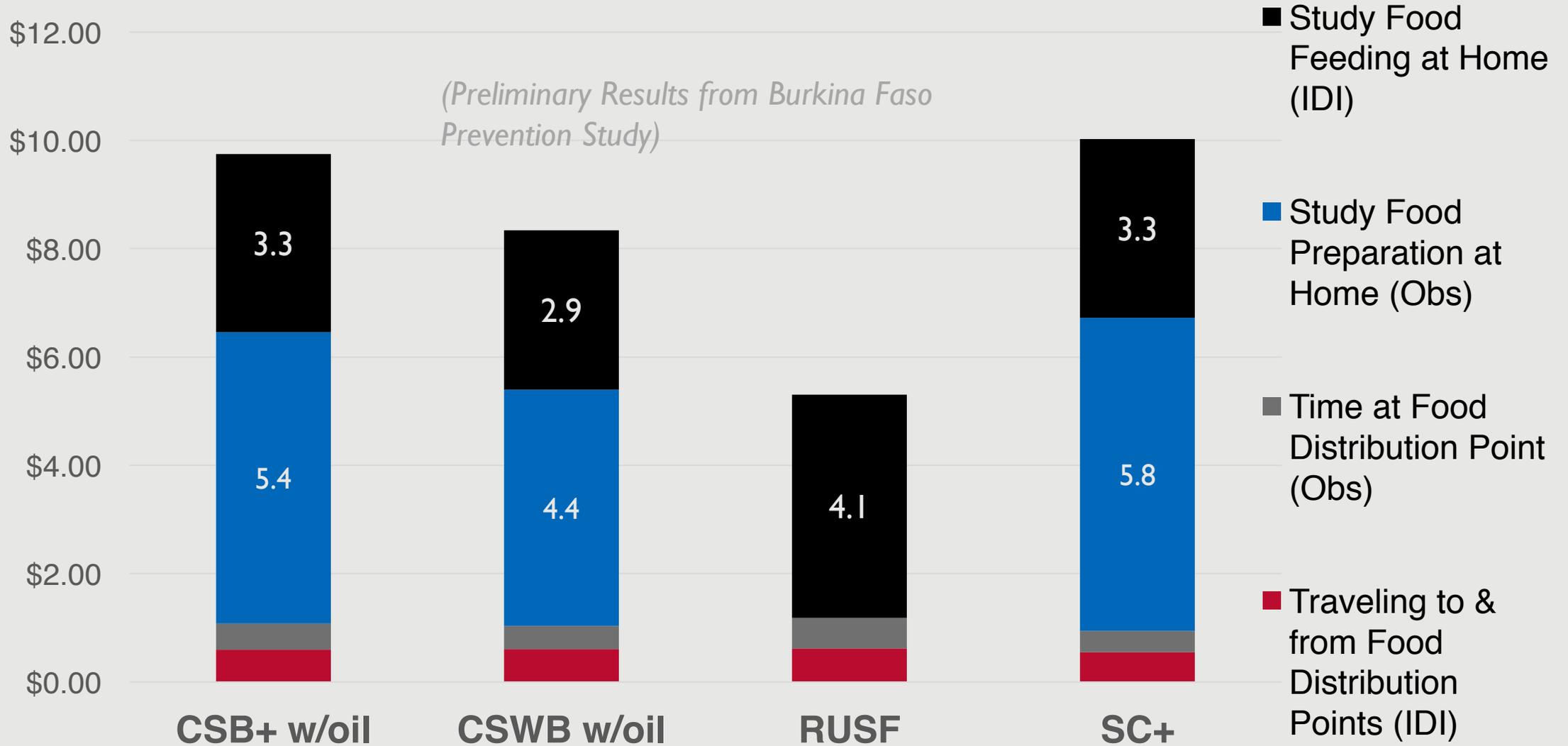
# Caregiver Perspective: Valuing Caregivers' Time to Participate

$$\text{Opportunity Cost of Time} = \text{Hours of Time} \times \text{Estimated Hourly Wage}$$

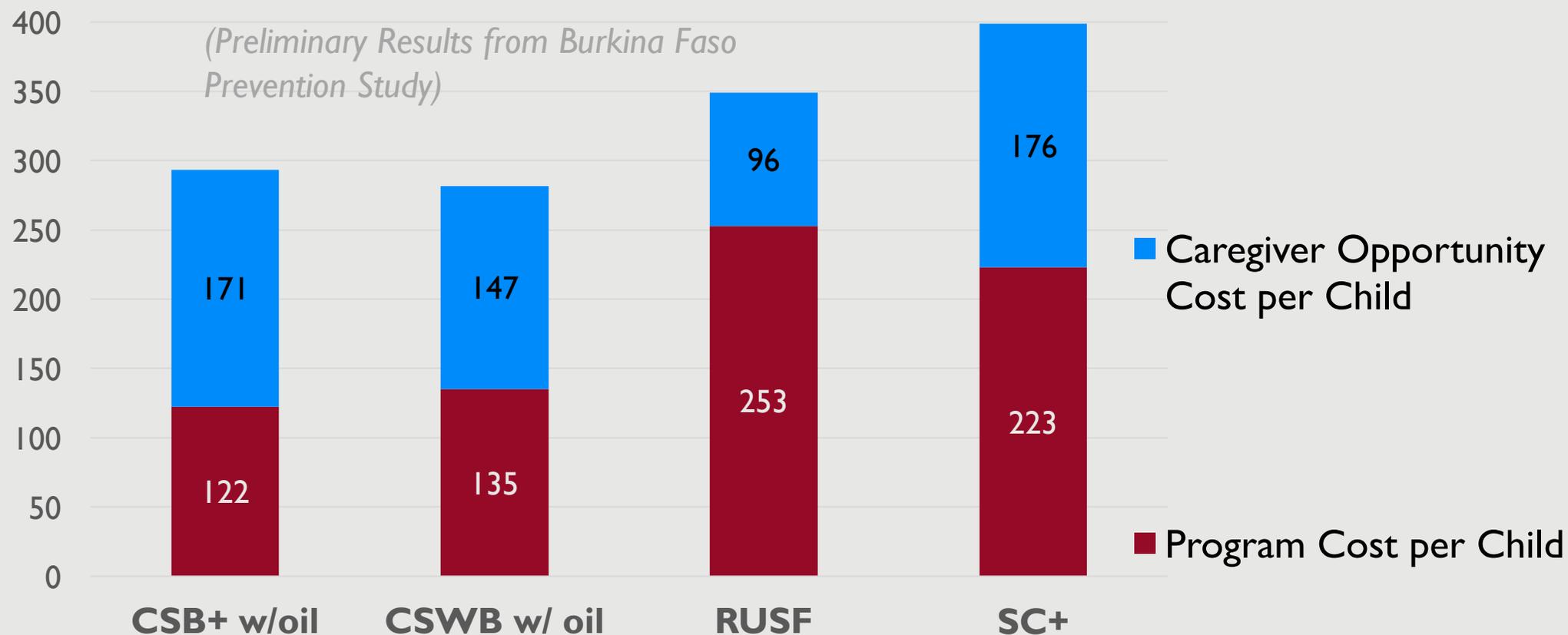
↑  
*Self-reported  
& observed time  
from costing  
instruments*

- ↑
- Burkina Faso Study: \$0.21 USD/hr
- Mandated minimum monthly wage in the formal sector: 30,684 CFA = 53 USD
  - Standard workweek of 60 hours for household workers
  - Approved by local field team

# Opportunity Cost of Caregiver Time per Monthly Ration at \$USD0.21/hr by Caregivers' Activity Types

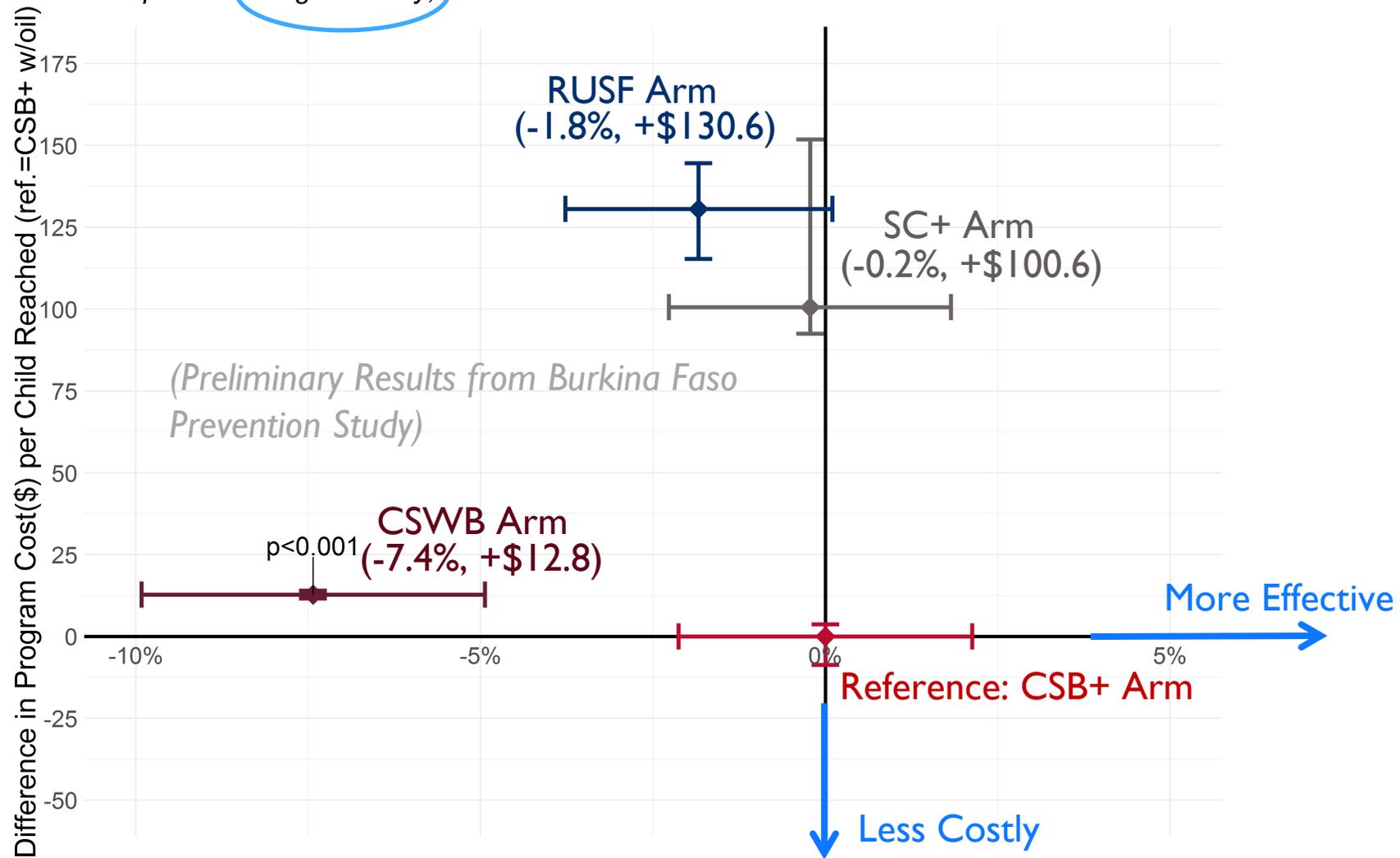


## Total Cost (\$USD) per Child Reached with Inclusion of Both Perspectives



# Incremental Cost-Effectiveness Plane for Stunting Prevention

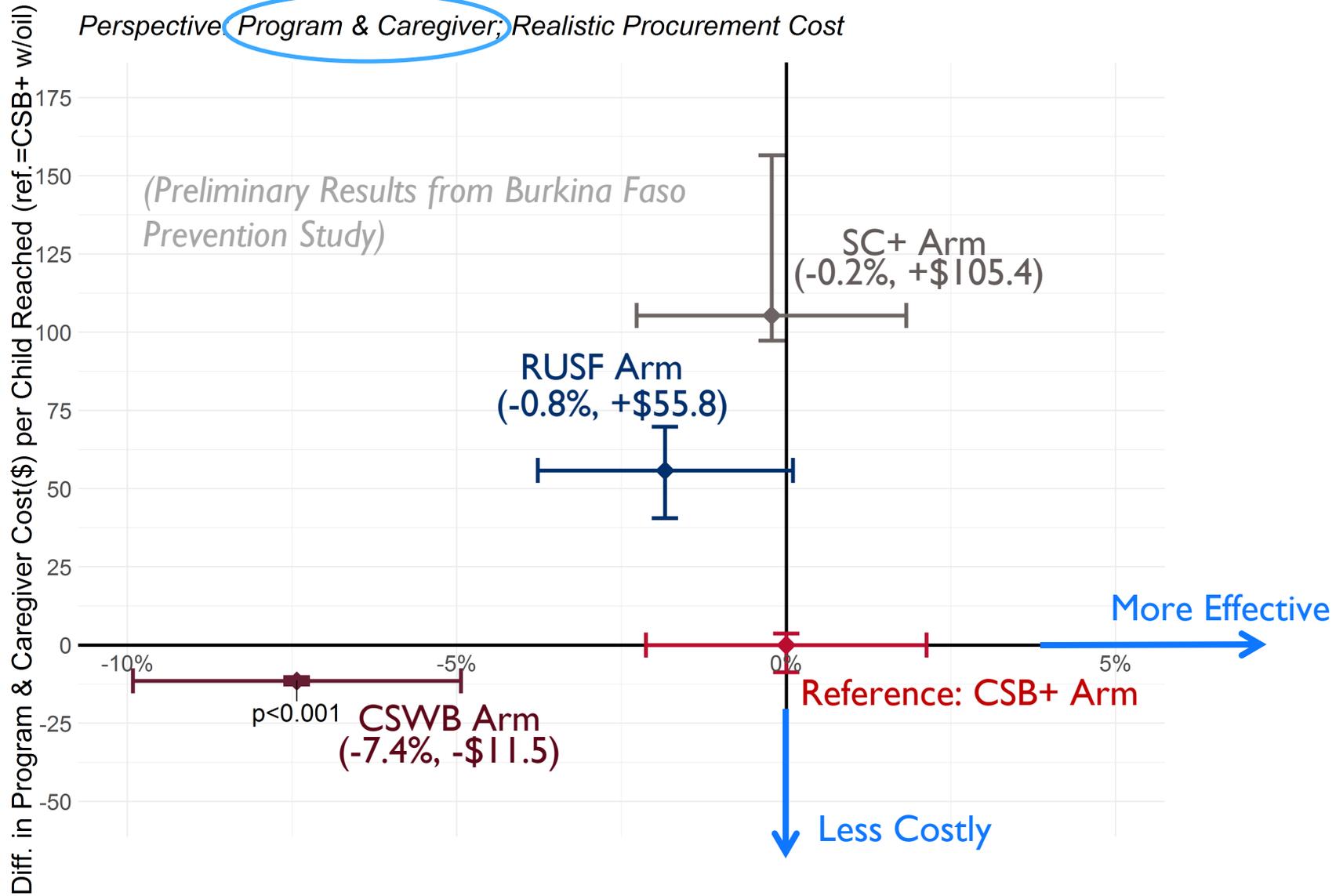
Perspective Program Only; Realistic Procurement Cost



Predicted Difference in Averting Stunting(%) at Endline (ref.=CSB+ w/oil)

SC+, RUSF, and CSWB w/ oil Compared to CSB+ w/ oil(Reference Arm)

# Incremental Cost-Effectiveness Plane for Stunting Prevention



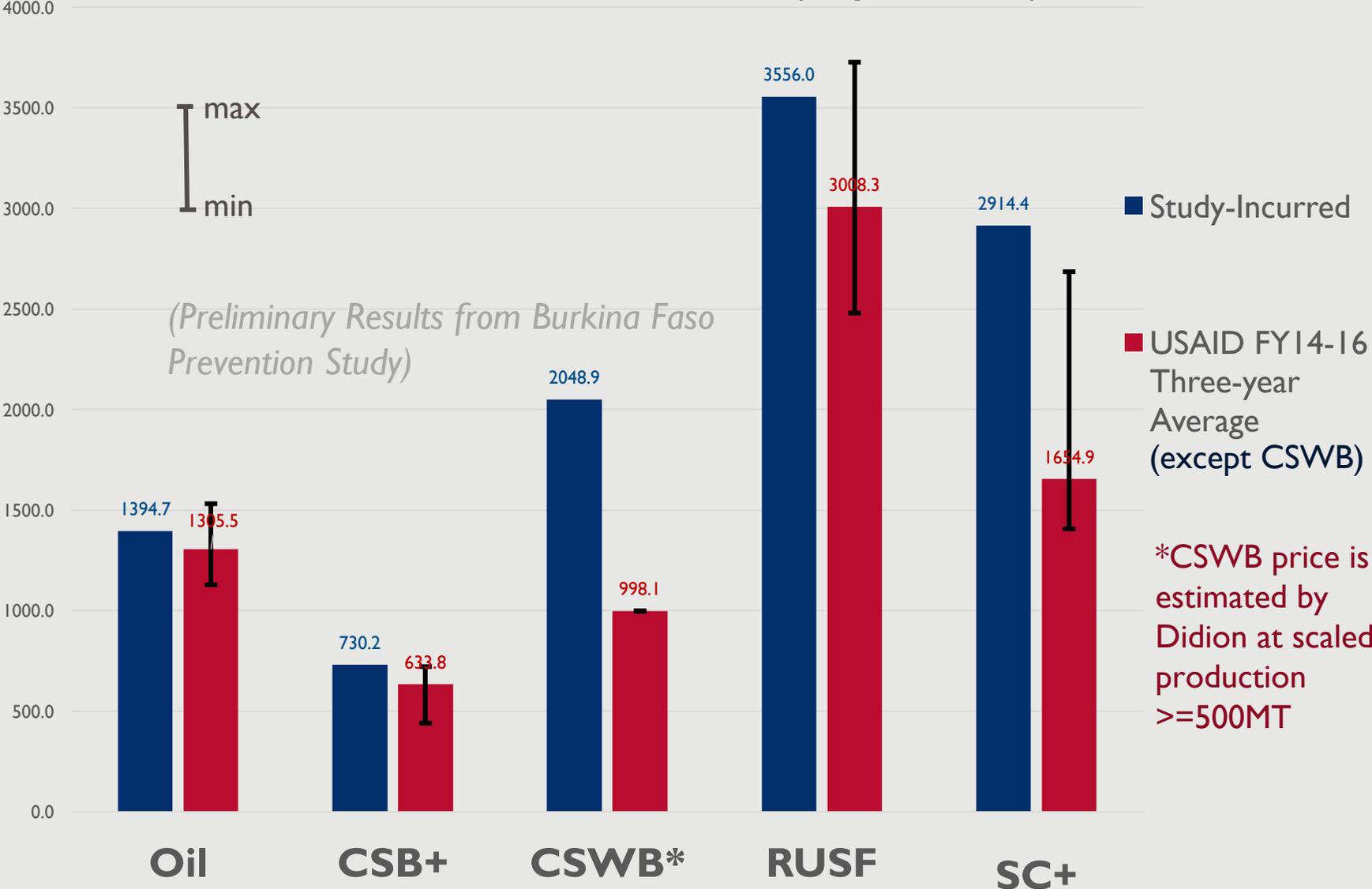


## **Lesson 3: Costing Product Procurement & International Freight**

- Replacing study-incurred costs with realistic prices/ quotes from USAID historical data, product suppliers and freight forwarders improved generalizability of study results.

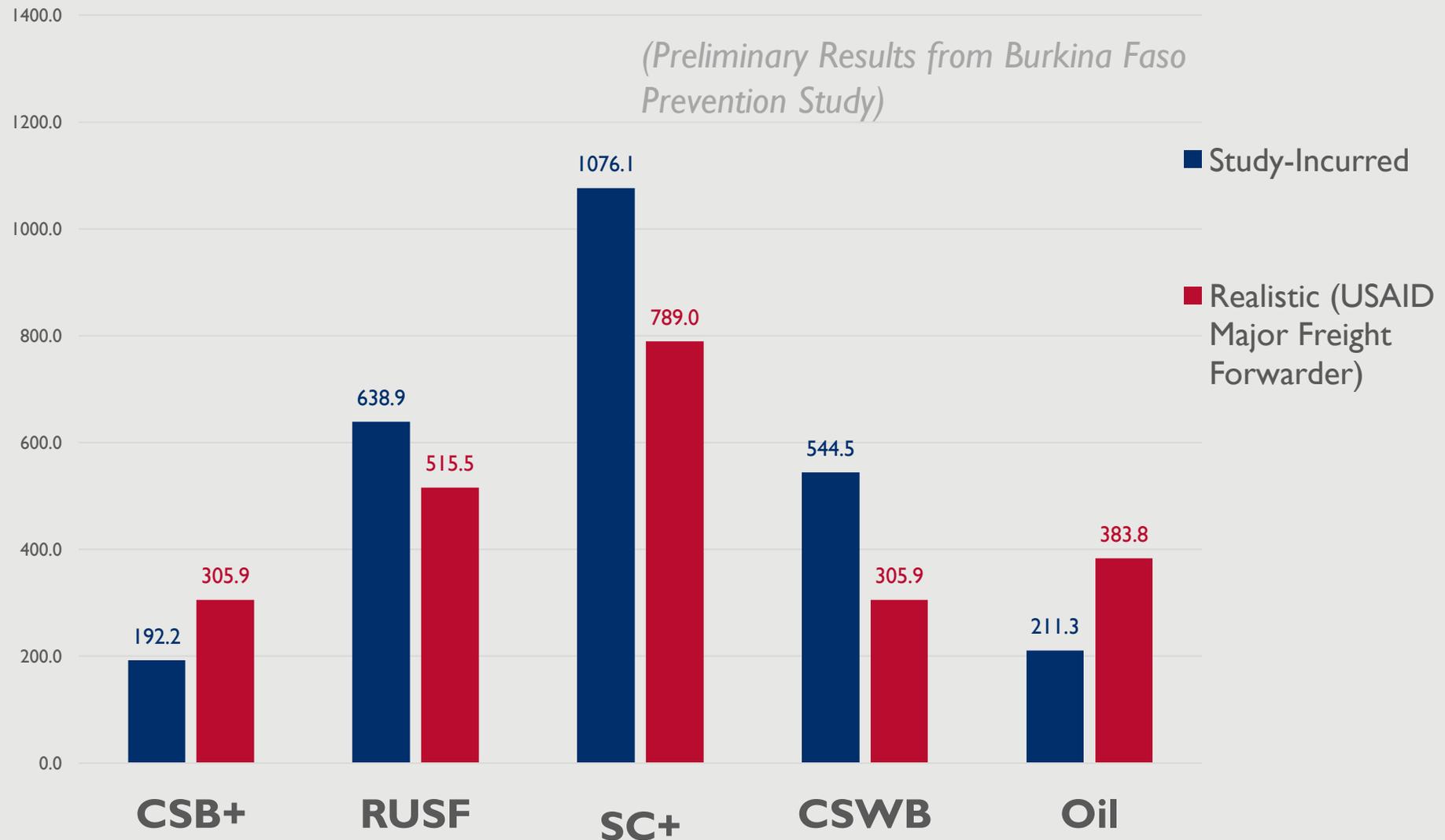
# Study-Incurred versus Realistic Food Product Price (\$ per MT)

Source: USAID FFP Program Operations Division (POD); Didion



# Study-Incurred versus Realistic International Freight Cost (\$) per MT

Source: BKA Logistics



## Take-aways

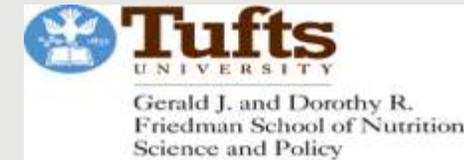
- CE is critical to programming decisions in food aid
- A single number to report cost and cost-effectiveness is not sufficient: robustness and sensitivity analyses are important
- Costing perspectives and components affect cost and cost-effectiveness comparisons
- CE results should be incorporated along with an understanding of other programmatic factors

# Acknowledgement (Burkina Faso Study)

- **USAID:** Funder
- **Tufts University:** Beneficiary of Food For Peace/USAID grant for food aid research
- **Institut de Recherche en Sciences de la Santé (IRSS):** Research implementation partner
- **ACDI/VOCA:** Prime awardee implementing Title II program, Victoire sur la Malnutrition (ViM).
- **Save the Children:** Sub-prime in consortium implementing the ViM program
- **Study participants** from Sanmatenga Province, Burkina Faso
- **Industry partners** who produce the foods



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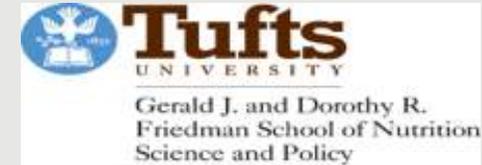


# Acknowledgement (Sierra Leone Study)

- **USAID:** Funder
- **World Food Program:** Logistical and commodity management support for SFP
- **Sierra Leone, Ministry of Health and Sanitation Nutrition Directorate:** local coordination and technical support
- **Tufts University:** Beneficiary of Food For Peace/USAID grant for food aid research
- **Washington University/St. Louis School of Medicine:** Research partner and technical support to SFP
- **Caritas Sierra Leone/Bo:** Research implementation partner
- **Project Peanut Butter:** Partner implementing the Supplemental Feeding Program for MAM Children
- **Study participants** from Pujehun District, Sierra Leone
- **Industry partners** who produce the foods



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# FAQR Work Streams: Field Research & Cost-Effectiveness

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**Thank You!**



[Applying Cost-Effectiveness in Research for Food Aid and Nutrition Programming: Methods and Policy Applications]

# Considerations for Calculating Cost-Effectiveness of Community Management of Acute Malnutrition (CMAM) Programs

27<sup>th</sup> June 2018

Food Assistance for Nutrition Evidence Summit

Washington D.C.

Dr. Natasha Lelijveld



 [nowastedlives.org](http://nowastedlives.org)

 [@nowastedlives](https://twitter.com/nowastedlives)

## Presentation outline

Discuss considerations for C-E in CMAM research and programs via the following projects:

- **CMAM Research: ComPAS study**
  - ComPAS = Combined Protocol for Acute Malnutrition randomized controlled trial
  - Intervention vs Control allows for cost-EFFECTIVENESS analysis
- **CMAM Programs: IRC cost-efficiency reporting**
  - IRC's Best Use of Resources team analyzed eight CMAM programs
  - normal programming, without control data = cost-EFFICIENCY analysis

# ComPAS study: Background

- In current practice: SAM cases are treated with ready-to-use therapeutic food (RUTF), whereas MAM cases are often treated with ready-to-use supplementary food (RUSF) or fortified corn-soya blend (CSB++), or counselling, or nothing.
- Simplifying the current system to combine the treatment protocols for SAM and MAM using RUTF may be:
  - more cost-effective,
  - improve coverage
  - improve program adherence
  - while achieving similar rates of recovery
- ComPAS is trialling a “combine protocol” which uses MUAC–only diagnosis, and one product (RUTF) at a standardised dosage for SAM and MAM, compared to a weight-based dosage of RUTF and RUSF.
- Prior analysis found that two 92g sachets of RUTF (1,000 kcal) meets the total energy requirements for >95% of children with SAM, and one 92g sachet of RUTF (500 kcal) meets half the energy requirements for >95% of children with MAM

## ComPAS study: CEA Methods

- For assessing total economic cost for each protocol from a societal perspective, data on program and caregiver costs were collected.
- Interviews were conducted with key informants representing clinic staff, support staff and partners, as well as caregivers; and accounting data will be analysed at the end of the trial (August 2018).



# ComPAS study: Objectives and Hypothesis

**Hypothesis for CEA:** implementing the combined protocol will be more cost-effective than standard protocol due to streamlined logistics at clinic level, reduced length of treatment, especially for MAM, and reduced dosages of RUTF.

## Objectives:

- 1. Quantify the economic cost to programmers using a combination of activity based costing and ingredients approach.
- 2. Quantify the economic cost to households
- 3. Estimate any incremental costs to the wider health system using programme referral data and published literature.
- 4. Compute the incremental cost per child recovered for the combined protocol compared to the standard protocol.
- 5. Present the costs and any significant differences in the primary and secondary outcomes (i.e. recovery rate, coverage, defaulting, average weight gain, average MUAC gain and length of treatment) as a cost-consequence analysis.



# ComPAS study: Methods

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Abstract    Background    **Methods**    Discussion    Trial status    Declarations    References    Comments

Study protocol | [Open Access](#) | [Open Peer Review](#)

## The "ComPAS Trial" combined treatment model for acute malnutrition: study protocol for the economic evaluation

Natasha Lelijveld  , Jeanette Bailey, Amy Mayberry, Lani Trenouth, Dieynaba S. N'Diaye, Hassan Haghparast-Bidgoli and Chloe Puett

*Trials* 2018 19:252  
<https://doi.org/10.1186/s13063-018-2594-7> | © The Author(s). 2018  
Received: 7 December 2017 | Accepted: 14 March 2018 | Published: 24 April 2018

[Open Peer Review reports](#)

### Abstract

#### Background

Acute malnutrition is currently divided into severe (SAM) and moderate (MAM) based on level of wasting. SAM and MAM currently have separate treatment protocols and products, managed by separate international agencies. For SAM, the dose of treatment

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# ComPAS study: Results so far



VS



# ComPAS study: Results so far – food products

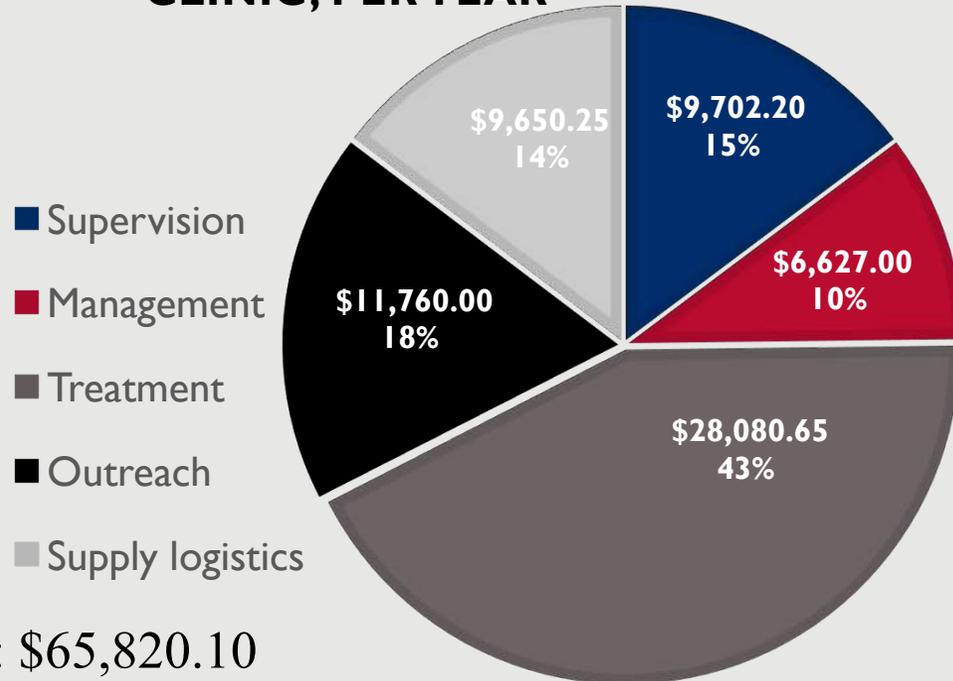
- Savings due to streamlining of logistics were not apparent in Kenya due to centralised distribution of all medical supplies through KEMSA.
- In S.Sudan, cost of the RUSF supply chain alone is conservatively \$8,000 for these 12 clinics per year, so that would be saved
- Preliminary results suggest that the major cost-saving of the intervention will be due to reduced RUTF dosages:
  - Combined protocol SAM children receive 14 sachets per week
  - Standard protocol SAM children receive between 14 and 35 sachets per week

RUTF	Standard Protocol	Combined Protocol
Average sachets per visit	21	14
Average sachets per child (so far)	77	42

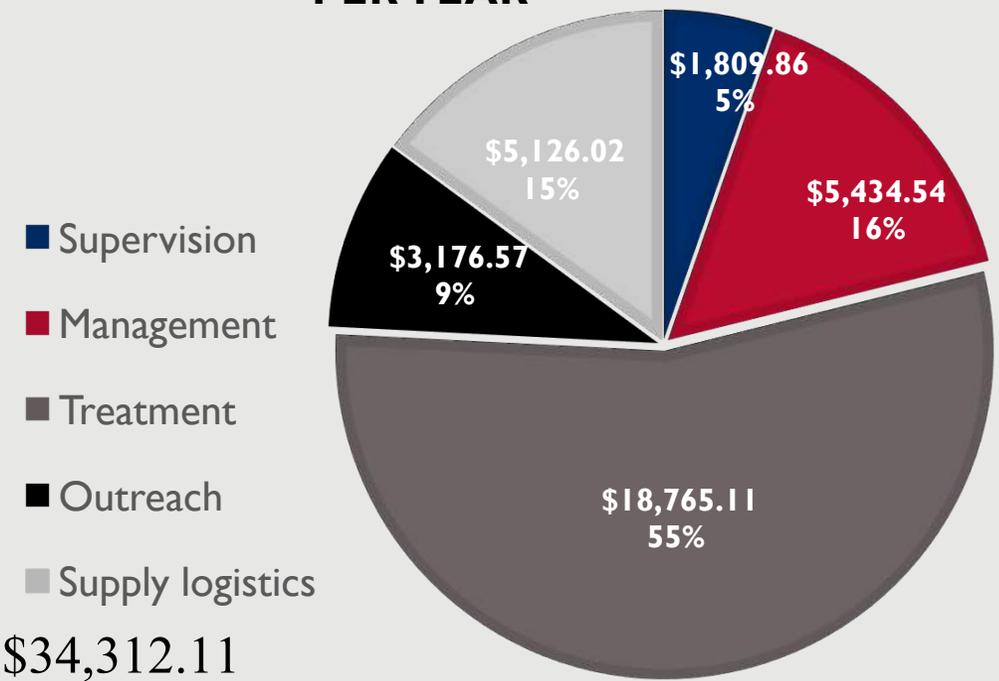
# ComPAS study: Results so far – staff costs

- We found no apparent difference in staff costs between protocols
- There is however large differences between study sites:

**S.SUDAN: STAFF COSTS PER CLINIC, PER YEAR**



**KENYA: STAFF COSTS PER CLINIC, PER YEAR**



# ComPAS study: Results so far – cost to caregivers

No differences between intervention and control protocol

## Kenya:

- Average costs per visit was \$1.72
- Average time per visit was 2h39mins
- Average hourly earnings were \$0.35
- Average economic costs to caregivers per visit: **\$2.17**

## South Sudan:

- Average costs per visit was \$0.08
- Average time per visit was 5h40mins
- Average hourly earnings were \$0.12
- Average economic costs to caregivers per visit: **\$0.80**



# ComPAS study: Results so far - lessons learnt

## Control vs Intervention:

- The change of dosage probably has the largest impact on the cost of treatment
- Streamlined supply logistics of the Combined Protocol may lead to cost savings in countries with decentralised medical supply chains – like S.Sudan.
- There was no evident difference in staff nor caregiver costs between control and intervention arms

## The CONTEXT does have a large impact on costs:

- Staff costs in Kenya, where clinics are integrated with other health services, were lower than in South Sudan. Will this cost-effective integration result in same effectiveness? i.e. cost per child recovered
- Higher prevalence of malnutrition in S.Sudan than Nairobi may justify the higher cost resulting in similar “cost per child recovered”

# IRC CMAM cost-efficiency studies

- More lessons about context....



**How do you increase the cost efficiency of malnutrition programs?**

**# of Health Centers: Changeable, to a Point**

One way to improve the number of children served is to increase the number of centers operated. However, there are declining marginal returns to more centers: eventually opening new centers will serve existing more patients more conveniently, rather than bringing new children under coverage.

**Cost per Health Center: Set by Context**

The cost per center includes the costs of paying for doctors, nurses, promoters, and supplies. The cost to the IRC of supporting a center will be different across contexts, but in a single context we are unlikely to be able to reduce the costs of operating already under-resourced centers.

$$\text{Cost per Child Treated} = \frac{\text{Total Cost}}{\text{\# of Outputs}} = \frac{\text{\# of Health Centers} \times \text{Cost per Health Center}}{\text{Population} \times \text{Malnutrition Rate} \times \text{Coverage Rate}}$$

**Population: Set by Context**

Across contexts, it makes sense to target places that are more densely populated, and therefore allow us to serve more people from a given health center. Within a single context, however, the population density is a major factor that affects cost efficiency but can't be affected by program activities.

**Malnutrition Rate: Set by Context**

It also makes sense to target places that have higher malnutrition rates, i.e. where the need for malnutrition treatment is greatest. Within a single context, however, the prevalence of malnutrition is a major factor that affects cost efficiency, but can't be affected by program activities.

**Coverage Rate: Changeable**

Within a particular context, the most powerful way to improve cost efficiency is to spread the costs of running health centers over more children by increasing coverage rates. This can be accomplished by opening more health centers, or by improving outreach at existing health centers.

## IRC cost-efficiency: Methods

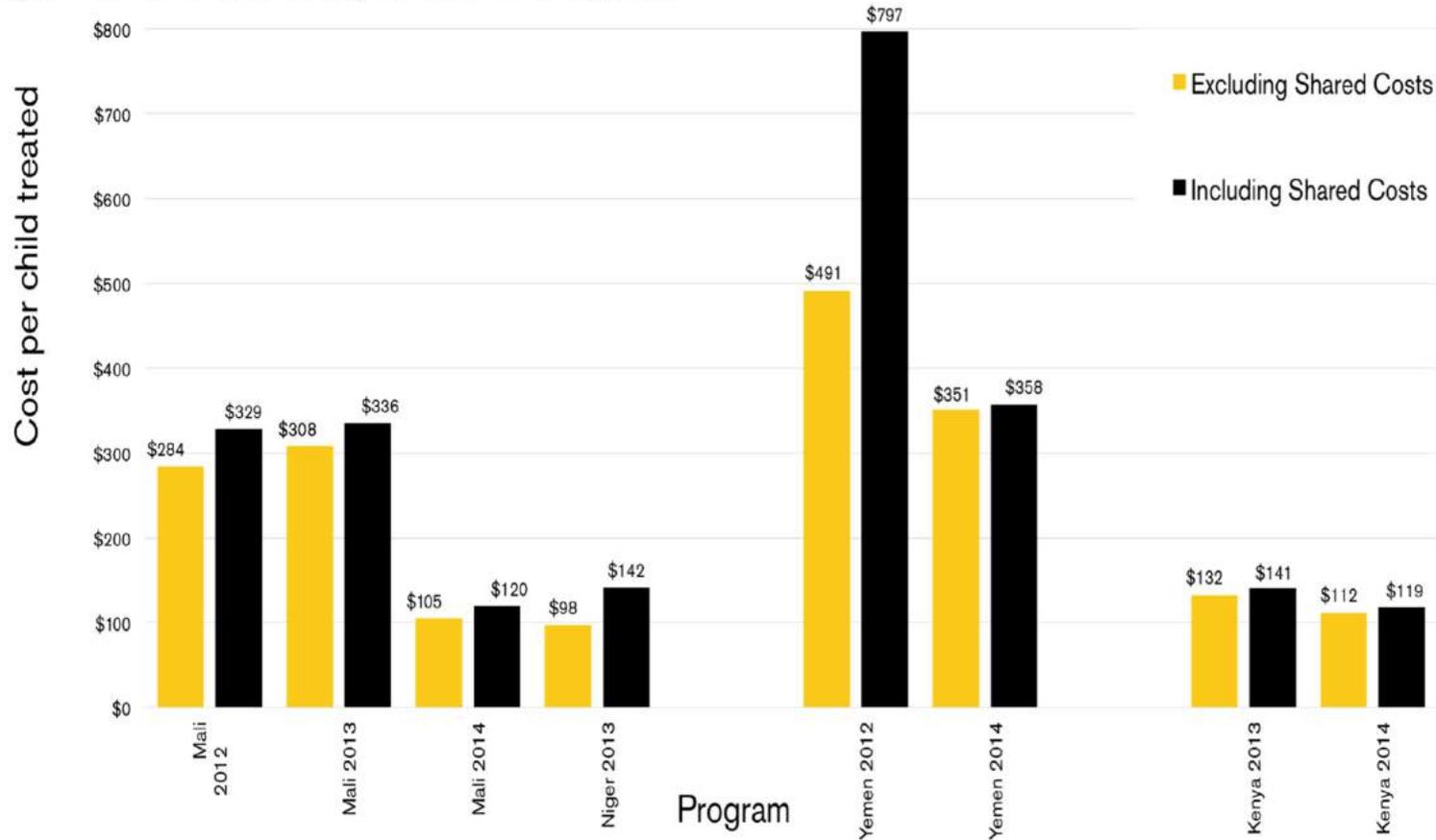
- IRC “Best Use of Resources” team calculated the “cost to IRC” of supporting eight different CMAM programs in the Sahel, East Africa, and the Middle East, where the IRC provided staffing, support, and supplies to existing government health infrastructure
- Cost-efficiency was simply calculated based on accounting data and number of children reportedly treated by the program
- Outcome = IRC cost per child treated
- Inputs provided by the government, varied in each setting and were not included in the cost. Also, cost of RUTF was not included as it was donated by UNICEF.



# IRC cost-efficiency: Results



**Figure 2. Cost Efficiency of CMAM Programs**



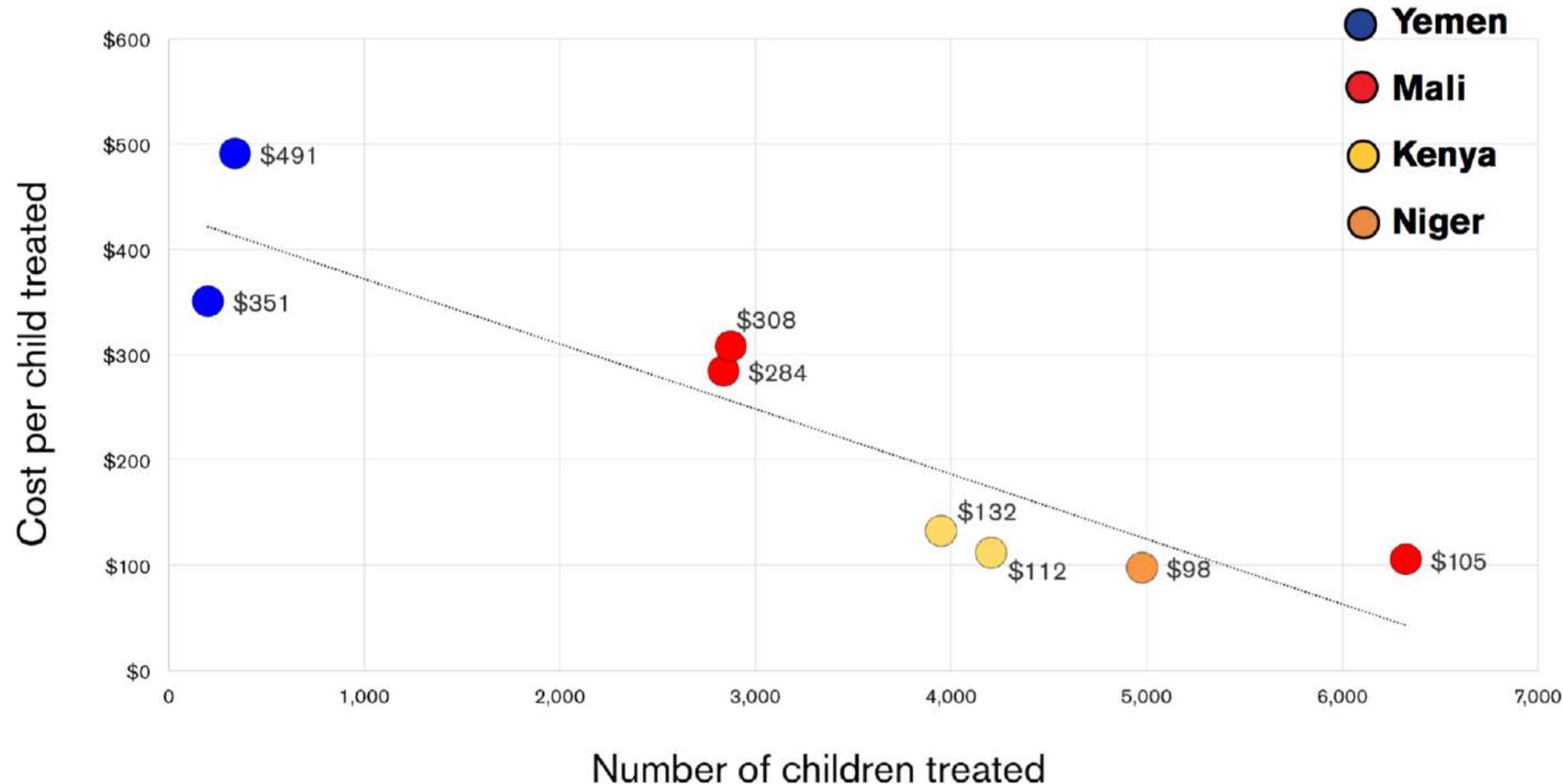
**The IRC's SAM programs cost between \$100 and \$500 dollars per child treated.**

The average cost per child treated was \$235, excluding the shared costs of country office management, and \$300 when said costs were included.

<sup>2</sup>In this cost efficiency analysis, "children treated" referred to the number of children admitted to a given facility during the year in question, who did not default (drop out of treatment before reaching recovery) during that time.

# IRC cost-efficiency: Results

Figure 3. Cost Efficiency Vs. Scale



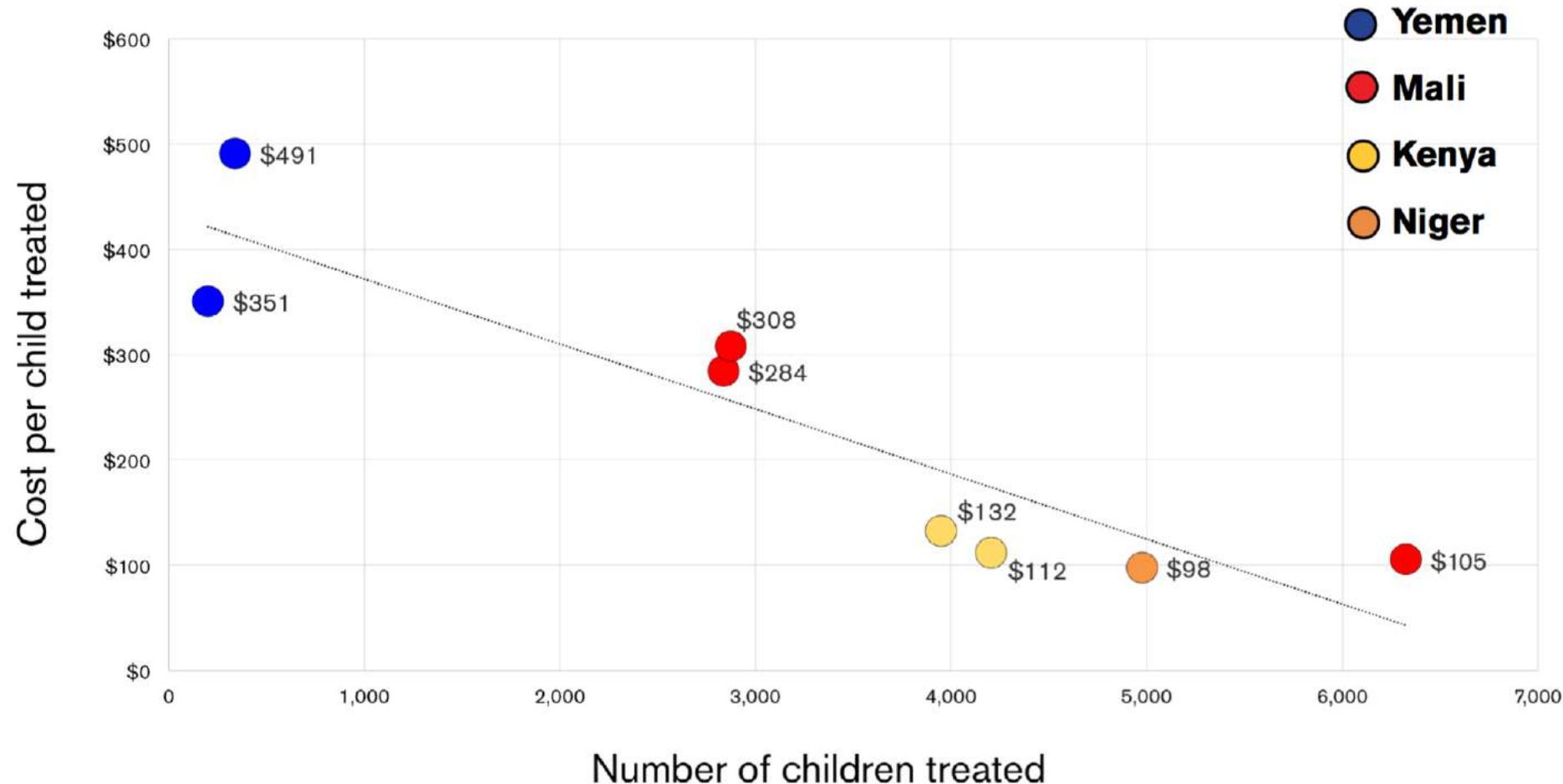
Cost efficiency is largely determined by contextual factors.

**WHERE** causes greater differences in cost efficiency than **HOW**

The two major drivers of efficiency = the density of children in need = the capacity of the national health system.

# IRC cost-efficiency: Results

Figure 3. Cost Efficiency Vs. Scale



‘Scale’ or “number of children reached” is affected by

- population density
- local malnutrition rate
- treatment coverage rate

Only COVERAGE is changeable, hence this should be the focus to maximize cost efficiency.

# Overall Conclusions

## Improving Cost-Effectiveness of CMAM

- Context has a large influence on cost efficiency and cost effectiveness
- CMAM Coverage and program integration are greatest driver of cost-efficiency
- Reducing RUTF dosage whilst still achieving comparable recovery rates will also improve cost-effectiveness

## Measuring cost-effectiveness of CMAM

- Because treatment rates are heavily influenced by context, we cannot have a single, global cutoffs for cost-efficiency
  - CMAM programs should be assessed relative to their potential cost-efficiency based on target coverage in that context
- It's not difficult to do simple cost-efficiency analysis for programs, using finance and monitoring data already available in most organizations. Just be open about the limitations.
- Its not difficult to include measures of cost-effectiveness in nutrition research – this is hugely lacking – especially for MAM - and could have large policy implications, especially in a non-inferiority trial like ComPAS

## Sharing cost-effectiveness information for CMAM

- Publish and share your cost-effectiveness and cost-efficiency results and protocols / methods
- Cost efficiency analysis can be conducted regularly for programs and data shared, so we get ever more precise benchmarks, and can use those to drive performance improvements *and* enough money where it's needed



## Acknowledgements

**No Wasted Lives Coalition** [www.nowastedlives.org](http://www.nowastedlives.org)

- Action Against Hunger
- International Rescue Committee
- Children’s Investment Fund

**Individuals:** Amy Mayberry, Jeanette Bailey, Caitlin Tulloch & Erin Byrne

