# Cost Analysis of Micronutrient Programs

## It's *not* about counting beans….

## It's about program implementation.

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**The Micronutrient Forum**
**Istanbul, Turkey**

**April 17, 2007**

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A2Z Micronutrients Sight Innovation

# Presentation Outline

- Why do a cost study?
- Micronutrient cost literature review
- Costing methods and the appeal of the ingredients-approach combined with activity-based costing (ABC)
- Pointers about designing and conducting a cost study
- Selective cost study findings to demonstrate the potential uses of cost studies and the value-added of the ingredients-approach combined with the ABC method

# Why do a cost study?

- Estimate budgetary requirements
- Provide accountability
- Provide input in developing an implementation plan
- Develop a management tool
- Inform policymakers (e.g., about the benefit:cost ratios of different interventions)
- Provide a more credible advocacy tool
  - for use within the MOH (district or central level) or
  - for the MOH to use with the MOF

# What do we know about micronutrient cost studies?

- Longstanding, general consensus: micronutrient interventions are among the most cost effective public health interventions.
- But the most commonly cited studies, were done more than 25 years ago when program interventions, health systems and country conditions were markedly different.
- Consequently, cost studies are often regarded as having limited relevance to program managers, there are few of them and their potential is underappreciated.

# There are Enormous Variations in the Estimated Costs of Micronutrient Interventions

| | *Average Cost per Person per Year in Constant US$* | | | | |
|---|---|---|---|---|---|
| | Minimum | Maximum | Ratio of Max-to-Min | Mean | Number of Studies |
| Supplementation | $0.03 | $188 | 6,267 | $8.22 | 38 |
| Fortification | $0.02 | $7.09 | 373 | $0.68 | 21 |

The cost literature is confusing.

It does not encourage program managers to consider cost analysis as a practical tool,

and does not encourage policymakers to regard it as a decision-making aid.

# Sources of Variation in Micronutrient Program Cost Estimates:

- Differences in types of programs
- Variations in how programs are implemented
- Variations in program context / country characteristics
- Variations in costing methodology
- How results are reported

**Implication: Questionable generalizability of the estimates**

# Variations in Program Characteristics / Implementation

| Fortificant / Fortificant Levels (ppm) | Fortificant Cost | |
|---|---|---|
| | Cost/Kg | Relative Cost |
| 1) Iron 60, Folic Acid 2 | $4.00 | 100% |
| 2) Iron 60, Folic Acid 2, Riboflavin 4, Thiamin 2.5 | $10.00 | 250% |
| 3) Iron 60, Folic Acid 2, Riboflavin 4, Thiamin 2.5, Zinc 30 | $12.00 | 300% |
| 4) Iron 60, Folic Acid 2, Riboflavin 4, Thiamin 2.5, Zinc 30, Vitamin A | $18.00 | 450% |

**Message: We need to be more specific when we talk about program interventions**

# Potential Scope of a Fortification Program Cost Study

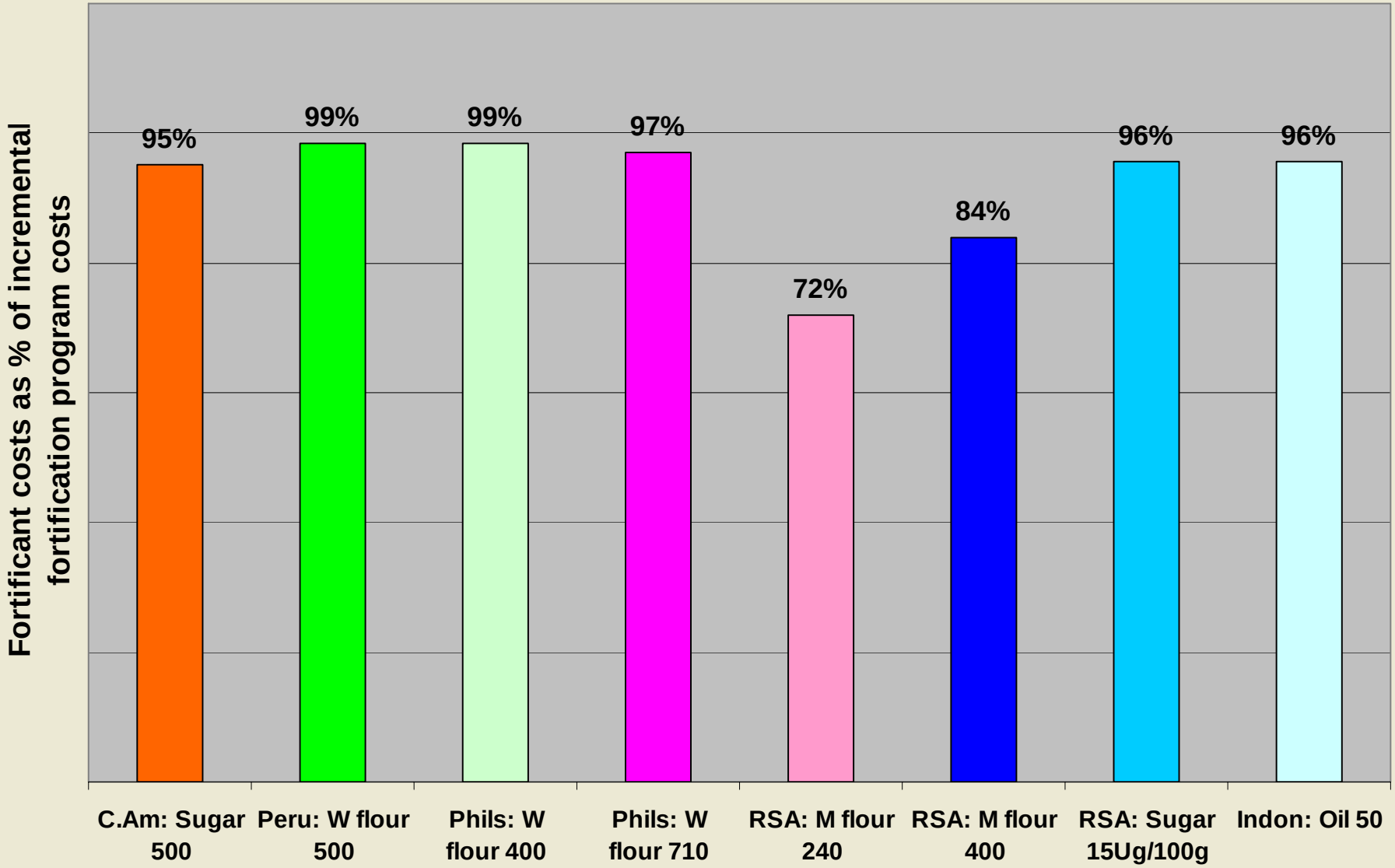
1. Types and quantities of fortificant(s)
2. The technology of introducing the fortificant

3. Identification of food vehicles (consumption,stability tests+)
4. In-plant quality control / quality assurance

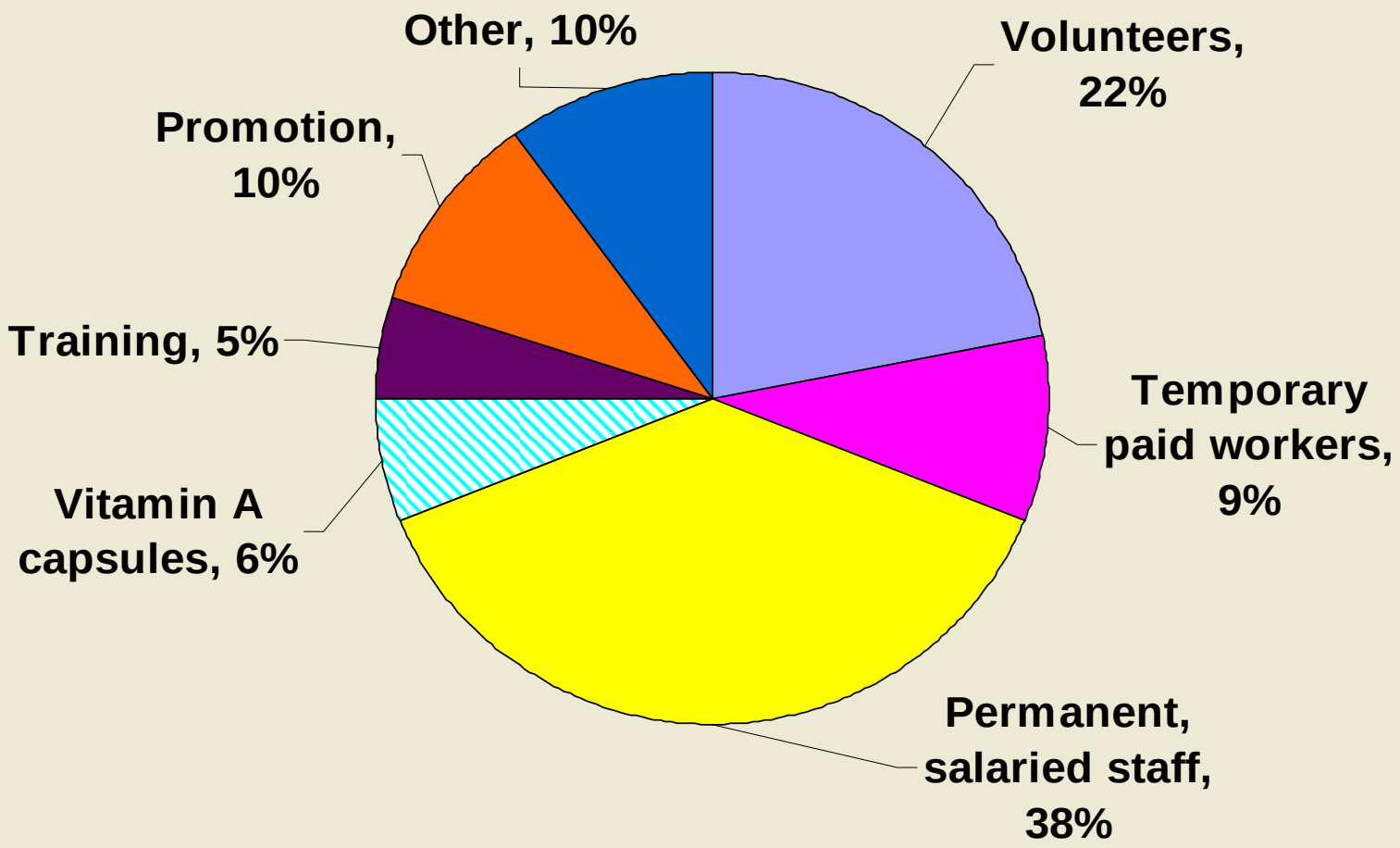
5. Government monitoring (e.g, in-plant, at point of sales, at point of consumption)
6. Government enforcement / compliance regulation
7. Social marketing and education
8. Nutrition status monitoring

# Vitamin A Fortification Program Cost Structure

**Fortificant costs as a percentage of incremental fortification program costs with different food vehicles and different levels of vitamin A**



# Common Cost Structure of Vitamin A Supplementation Programs



# Methodological Differences

- Some are due to differences in study objectives
  - ***Ex post* or *a priori* analysis of costs?**
  - **Budget requirements or total resource requirements?**
  - **Replication or scale-up tools? Within the same country or in other countries?**
- Some are due to differences in a study's funding level
- Differences in the level of analysis: National alone or more disaggregated
- Differences in scope: Analysis by funding source, program activity, or input
- Differences in cost measures

# Differences in Cost Measures

- Total program costs
- Average cost per program beneficiary
- Average cost per person year of protection
- Average cost per death averted
- Average cost per Disability Adjusted Life Year (DALY) saved

# Methodological Approaches to Cost Studies

- Financial analysis
  - Accounting-system based
  - Usually applied using a top-down
- Economic analysis
  - More inclusive: all resources are accounted for
  - Usually applied using a bottom-up
  - Households' participation costs (and other demand considerations) are often ignored—an oversight of growing significance

# Costing Methodology: A Preferred Approach

- Economic analysis
- Activity-Based Costing (ABC)
- The “ingredients” approach
  - Used by the WHO’s CHOICE (CHOsing Interventions that are Cost-Effective) Model
- Not an historical analysis, but a future-directed approach based on the program’s realities

# With Costs Calculated…

- By level of Government: national, regional, district, community
- By source of financing: National government, District government, CIDA, UNICEF, etc.
- By input: Personnel, vitamin A capsules, per diems, transportation, etc.)
- By program activity
- By service: vitamin A supplementation, de-worming, immunization, counseling, etc.
- Start-up versus Recurrent Costs

# Applying the Ingredients Approach combined with Activity-Based Costing

- Requires more information and more fieldwork
- Starts with the development of a detailed description of the program: defining the program's major activities and the types and quantities of inputs at each level of the program
- Produces what is usually to date the most systematic, comprehensive and detailed description a program's structure, inputs and implementation

# The PROCESS of Conducting an Ingredients Approach, ABC Study

- Data sources
  - Program reports
  - Financial data—budget, expenditures
  - Work plans, service delivery (HMIS) data
  - Interviews of staff—different types at different levels
- Surveys are often needed to:
  - Define key program activities
  - Quantify inputs (especially off-budget items and shared inputs)
  - Better understand program and input variations due to:
    - Contextual factors
    - Other, factors that affect performance (i.e., non-standardization of the program, variations in levels of demand/service provision)
- Construction of cost algorithms (to generalize to a level of the program, or to build one or a few prototypes)

# District Tool for Estimating Supplies Requirements and Costs by Distribution Site

| | |
|---|---|
| **Region:** | **Dawa** |
| **Zone** | **Hararghe** |
| **District** | **Wolita** |

| | | | Vitamin A | | | | De-Worming | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Distribution Site** | **Total Popula-tion** | **Target Pop. 6-59 months** (16.7%) | **Pop. 6-11 months** (1.9%) | **Pop. 12-59 months** (14.8%) | **Vit. A capsules** 100--100,000 IU capsules | **Vit. A capsules** 100--200,000 IU capsules | **Pop. 11-23 months** (3.8%) | **Pop. 24-59 months** (11.0%) | **Meben-dazol Tablets** 100--500mg | **Printed materials (Tally Sheets+)** |
| C | D | E | F | G | H | I | J | | K | L |
| Health Center #1 | 13,569 | 2,266 | 258 | 2,008 | 3 | 22 | 516 | 1,493 | 19 | 23 |
| School #1 | 14,092 | 2,353 | 268 | 2,086 | 3 | 23 | 535 | 1,550 | 20 | 24 |
| Health post #1 | 5,004 | 836 | 95 | 741 | 1 | 8 | 190 | 550 | 7 | 8 |
| Health Center #2 | 9,043 | 1,510 | 172 | 1,338 | 2 | 15 | 344 | 995 | 13 | 15 |
| Health post #2 | 21,334 | 3,563 | 405 | 3,157 | 4 | 35 | 811 | 2,347 | 30 | 36 |
| School #2 | 10,902 | 1,821 | 207 | 1,613 | 2 | 18 | 414 | 1,199 | 15 | 18 |
| Community Center #1 | 7,866 | 1,314 | 149 | 1,164 | 2 | 13 | 299 | 865 | 11 | 13 |
| Health Center #3 | 4,332 | 723 | 82 | 641 | 1 | 7 | 165 | 477 | 6 | 7 |
| Community Center #2 | 6,237 | 1,042 | 119 | 923 | 1 | 10 | 237 | 686 | 9 | 10 |
| **District Totals:** | **92,379** | **15,427** | **1,755** | **13,672** | **19** | **150** | **3,510** | **10,162** | **131** | **154** |

| | **Vit. A capsules** (100 @ 100,000 IU) | **Vit. A capsules** (100 @ 200,000 IU) | **Meben-dazole** (100-500 mg tablets) | **Printed Materials** | **Total Costs of Supplies** |
|---|---|---|---|---|---|
| **Unit Costs** (packaging varies) | **37.60** | **48.80** | **244.00** | **376.56** | |
| **Distribution Site** | | | | | |
| Health Center #1 | 107 | 1,078 | 4,698 | 8,533 | 14,416 |
| School #1 | 863 | 1,120 | 4,879 | 8,862 | 15,723 |
| Health post #1 | 306 | 398 | 1,733 | 3,147 | 5,583 |
| Health Center #2 | 554 | 718 | 3,131 | 5,687 | 10,090 |
| Health post #2 | 1,306 | 1,695 | 7,387 | 13,416 | 23,803 |
| School #2 | 667 | 866 | 3,775 | 6,856 | 12,164 |
| Community Center #1 | 481 | 625 | 2,723 | 4,947 | 8,776 |
| Health Center #3 | 265 | 344 | 1,500 | 2,724 | 4,833 |
| Community Center #2 | 382 | 496 | 2,159 | 3,922 | 6,959 |
| **District Totals:** | **4,931** | **7,339** | **31,985** | **58,093** | **102,348** |

# Operations Costs of Mobilization-Related Activities of the VASD Program

| | |
|---|---|
| **Region:** | Dawa |
| **Zone:** | Hararge |
| **District:** | Wolita |

| *Per Diem per:* | |
|---|---|
| Health Worker | 45 |
| Volunteer | 25 |
| Supervisor | 70 |
| Driver | 35 |

| | | Target Population | | Personnel Requirements | | | | Per Diems (Shillings) | | | | | Fuel Costs (100 Sh. / Day) | Social Mobili-zation | Total Costs of Organization + Mobilization |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Distribution Site | Number of Days | Total pop. | Target Pop. 6-59 months (16%) | Number of Teams | Health Workers (2/Team) | Volun-teers (3/Team) | Super-visors (1 per 2 Teams) | Health Workers | Volun-teers | Super-visors | Drivers | Total Per Diem Costs | | | |
| A | B | C | D | E | F | G | I | K | L | N | | O | Q | R | S |
| Health Center #1 | 2 | 13,569 | 2,171 | 4 | 7 | 11 | 2 | 2,357 | 1,964 | 458 | 2 | 4,321 | 362 | 1,000 | 5,682 |
| School #1 | 2 | 14,092 | 2,255 | 4 | 8 | 11 | 2 | 2,542 | 2,118 | 494 | 2 | 4,660 | 376 | 1,000 | 6,036 |
| Health post #1 | 2 | 5,004 | 801 | 1 | 3 | 4 | 1 | 321 | 267 | 62 | 1 | 588 | 133 | 1,000 | 1,721 |
| Health Center #2 | 2 | 9,043 | 1,447 | 2 | 5 | 7 | 1 | 1,047 | 872 | 204 | 1 | 1,919 | 241 | 1,000 | 3,160 |
| Health post #2 | 3 | 21,334 | 3,413 | 4 | 8 | 11 | 2 | 3,884 | 3,237 | 755 | 2 | 7,120 | 569 | 1,000 | 8,689 |
| School #2 | 2 | 10,902 | 1,744 | 3 | 6 | 9 | 1 | 1,521 | 1,268 | 296 | 1 | 2,789 | 291 | 1,000 | 4,080 |
| School #3 | 2 | 7,866 | 1,259 | 2 | 4 | 6 | 1 | 792 | 660 | 154 | 1 | 1,452 | 210 | 1,000 | 2,662 |
| Health Center #3 | 2 | 4,332 | 693 | 1 | 2 | 3 | 1 | 240 | 200 | 47 | 1 | 440 | 116 | 1,000 | 1,556 |
| Health post #3 | 2 | 6,237 | 998 | 2 | 3 | 5 | 1 | 498 | 415 | 97 | 1 | 913 | 166 | 1,000 | 2,079 |
| **Totals:** | | **92,379** | **14,781** | **23** | **45** | **68** | **11** | **13,201** | **11,001** | **2,567** | **11** | **24,202** | **2,463** | **9,000** | **35,666** |

# Practical Considerations in Designing a Cost Study

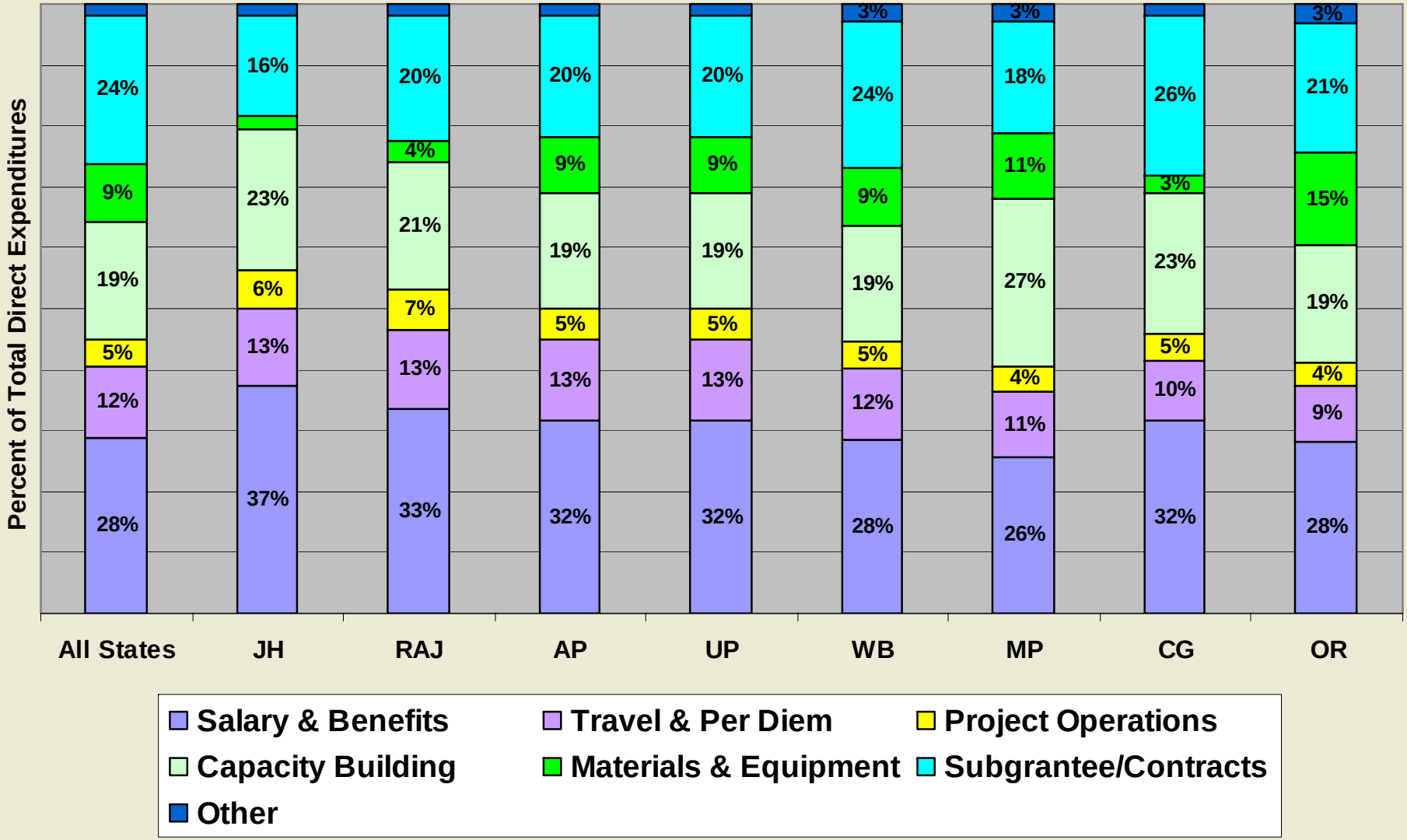
- Focus on the most important factors in terms of:
  - Financial significance—i.e., the “big ticket” items
  - Strategic significance—e.g., vitamin A capsules
  - Sources of substantial variation in costs—to better understand how to generalize the results and construct algorithms

# Study Design Considerations

- Costs of health programs are generally driven by four major sets of factors:

  **1. Structural characteristics**: How a program is organized or set up (e.g., the levels of administration and numbers of the number of distribution sites)

# Composition of CARE/India's Integrated Nutrition-Health Program's Direct Expenditures by State, 2005



# Program Factors that are Major Cost Determinants

2. **Operations:** The specific types of services provided (the activities required to provide them, the frequency with which the service are provided, what inputs they require to provide, etc.)

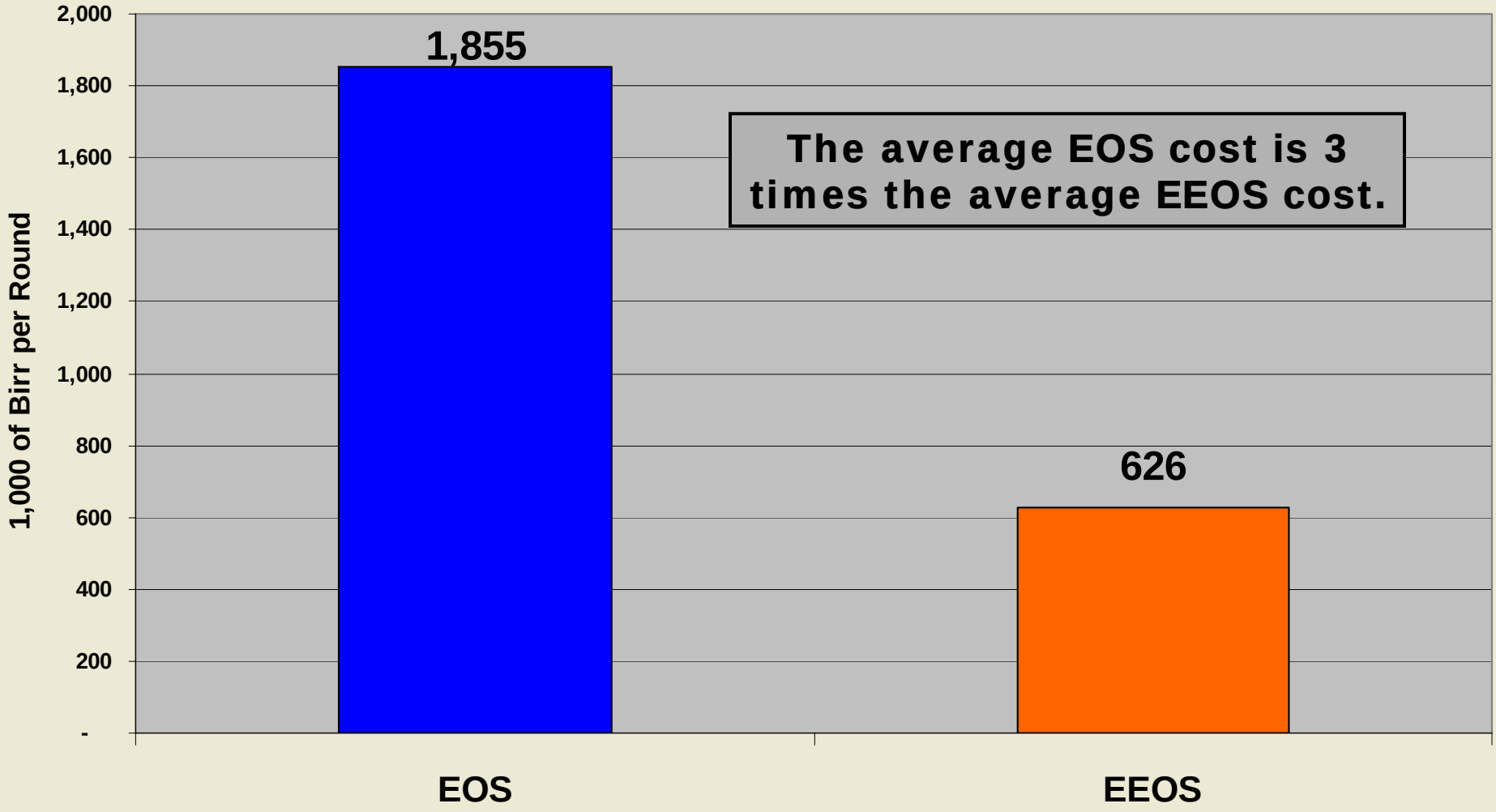
3. **Scale:** The extensiveness or coverage of the program (national, sub-national, pilot)

4. **Personnel costs**: Usually constitute 50-75 percent

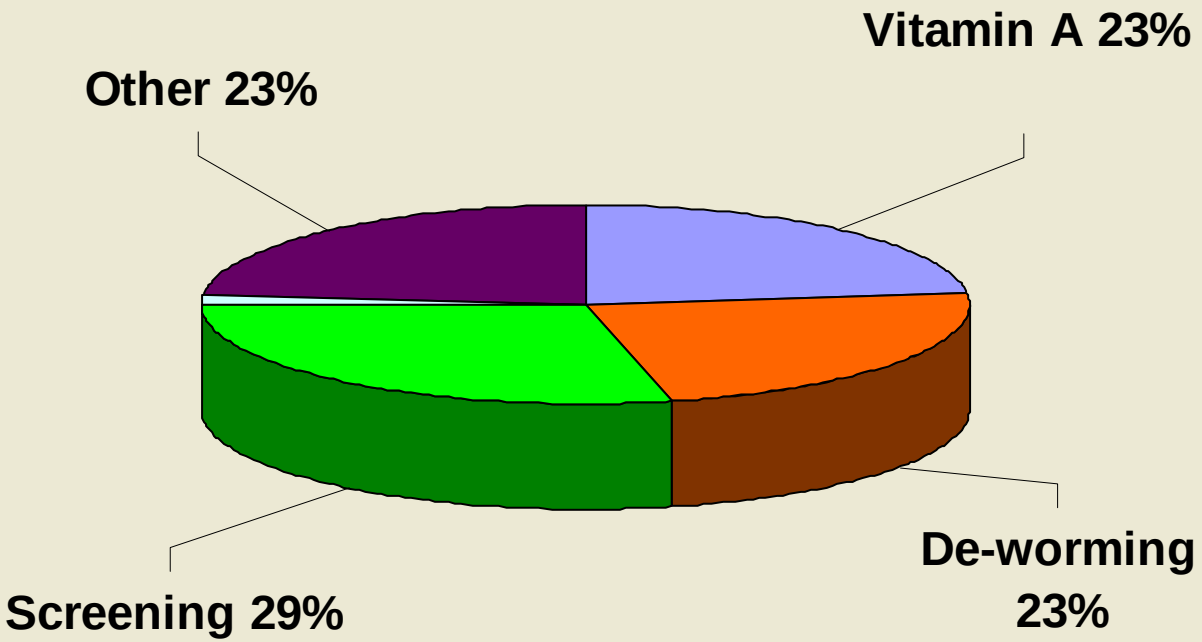
# Key Activities of the Ethiopian EOS Program

1. Training of Trainers (TOT)
2. Training of Service Providers (TOSP)
3. Sensitization Meetings
4. Other organizational meetings
5. Promotion and mobilization meetings
6. Supplies (Campaign day materials)
7. Repackaging supplies
8. Supply transport
9. Campaign Days (excluding supplies)
10. Review Meeting
11. Other Regional and Zonal Office activities

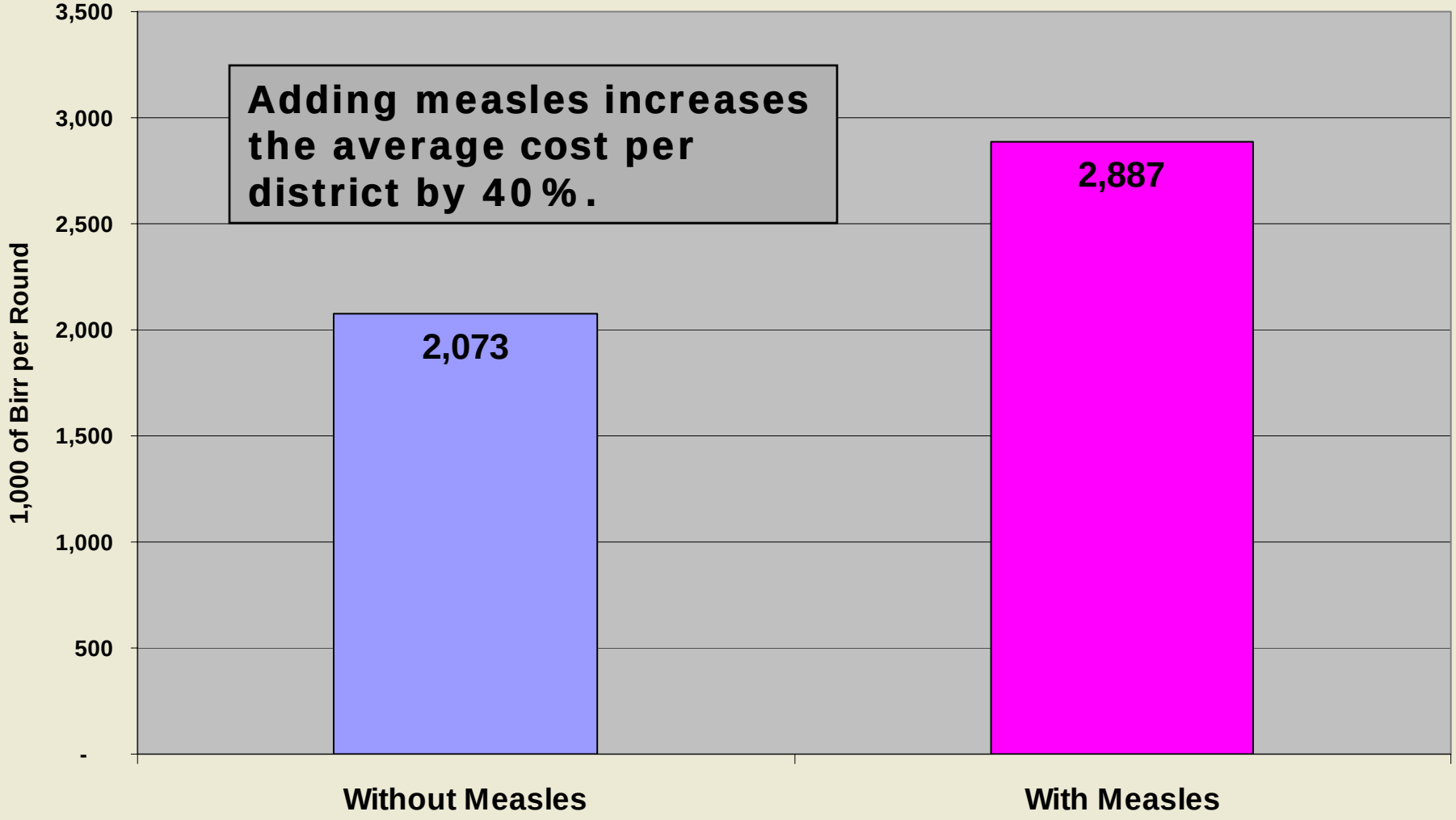
# Average Total Cost per District per Round of the Ethiopian EOS/EEOS



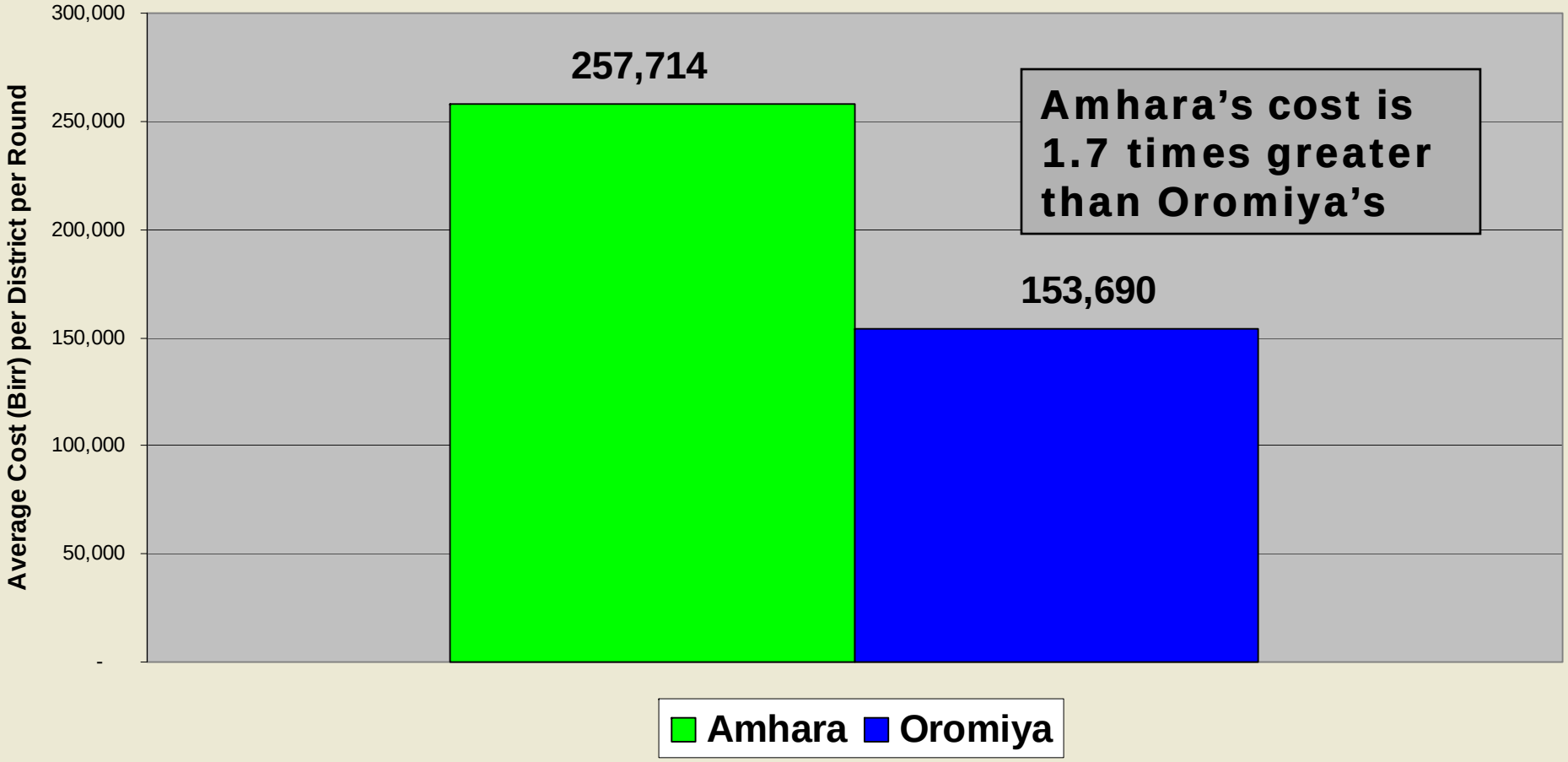
# **Total Cost of the Ethiopian EOS Program by Service** (Without Measles)



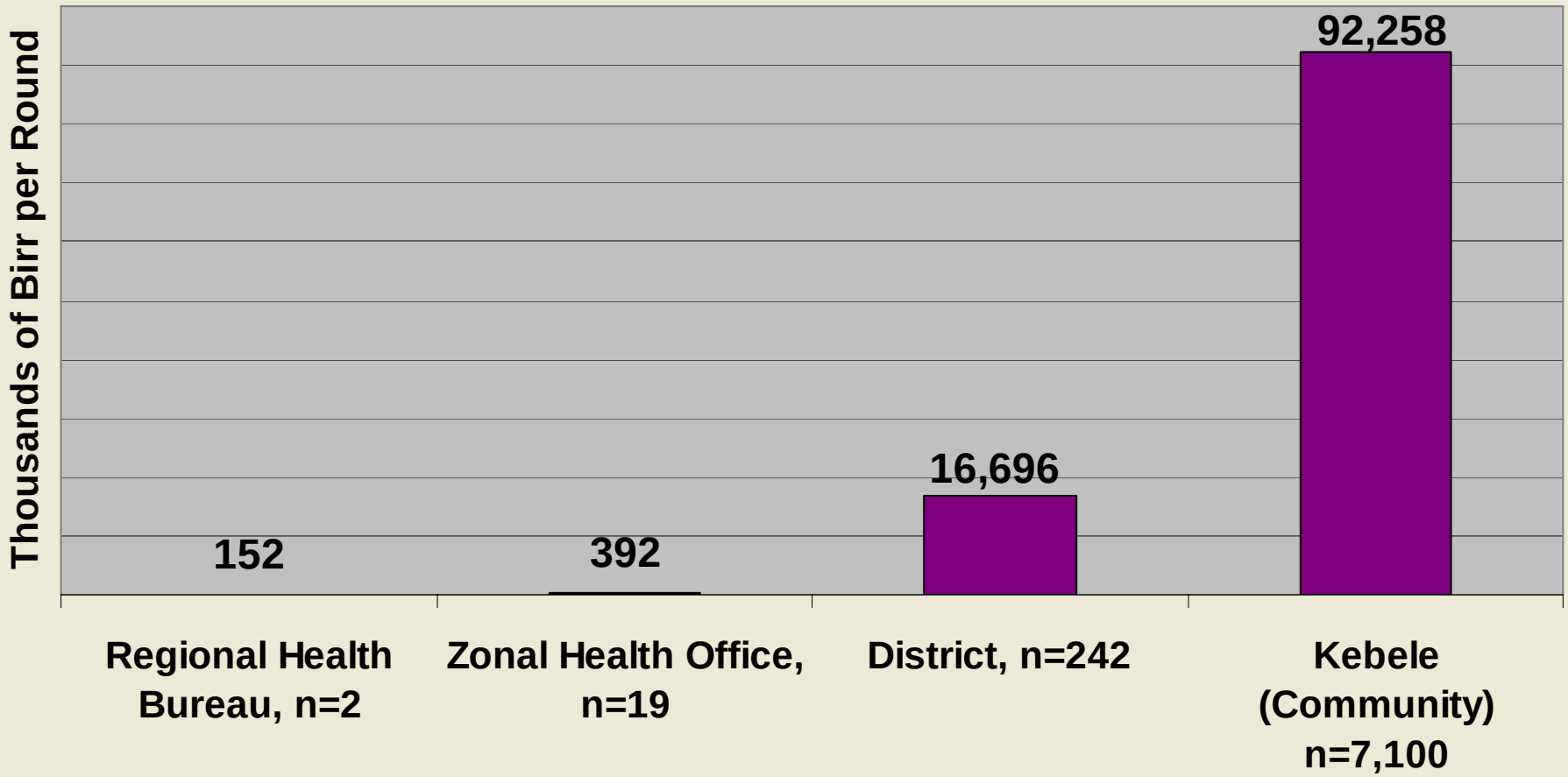
# Average Total Cost per District per Round of the Ethiopian EOS



# Comparing Average Total Cost per District of the Ethiopian EEOS Program



# Total Cost of the Ethiopian EOS/EEOS in Amhara and Oromiya, by Level of Government



# Costs Vary by:

- **PROGRAM**: EOS versus EEOS (screening)
- **SERVICE PACKAGE**: Whether or not it includes measles
- **THE COST OF SUPPLIES**: Deworming supplies cost nearly 15 times more than vitamin A costs
- **REGION**: Amhara's average costs per woreda for EOS are lower than Oromiya's, but its EEOS costs are higher
- **PROGRAM LEVEL**: Most costs are concentrated at the lowest/ most local level

# Implications of Variations in Cost

- One must be cautious in talking about an "average" cost measure of the program.
- The "average" hides important variations in costs.
- These cost variations become more important as we become more concerned about implementation and work more directly with decentralized units.

**Some examples of using cost study results to inform program implementation and policy…**

# Most of the Costs of the Ethiopian EOS/EEOS are Independent of the Number of Beneficiaries

- The cost of the EOS/EEOS teams, supervisors and transportation constitute 99 percent of the costs of campaign day and are fixed costs
- Only the supplies costs of campaign day change as the number of beneficiaries changes

# A Large Proportion of the Costs of the EOS/EEOS are Independent of the Number of Beneficiaries (cont'd)

- **IMPLICATION 1**: Expanding coverage adds relatively little to costs and results in the overall cost per beneficiary falling.
- **IMPLICATION 2**: Depending upon how effective they are, additional efforts and costs incurred in attempting to increase participation may be cost-effective.

# Annual Recurrent Costs of Expanding CARE/India's Integrated Health and Nutrition Program

Current program: 9 States, 81 district teams, with a state average of 5 NGOs each covering 4 blocks

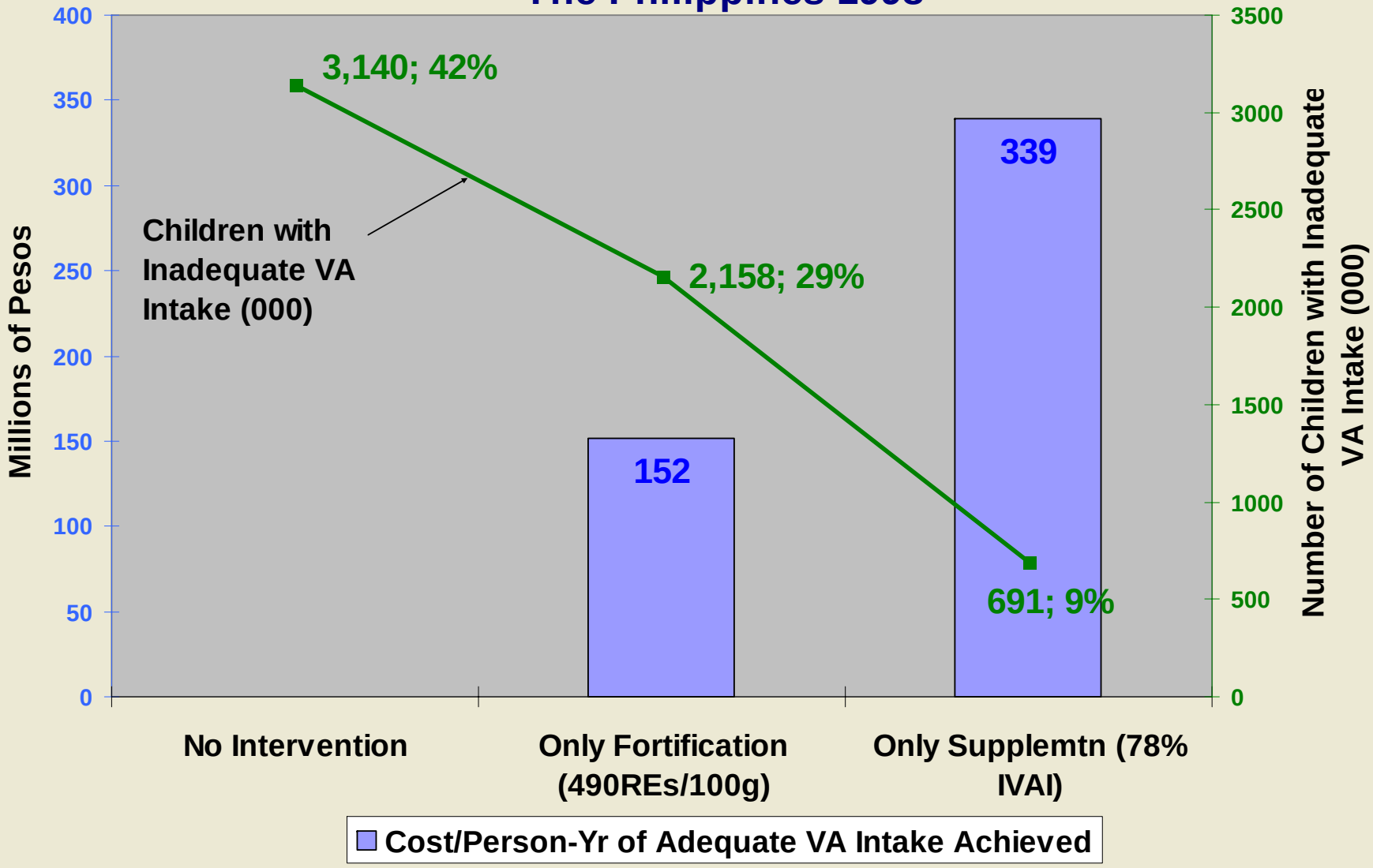
- Cost of replicating the entire program: $12.3 m
- Cost of adding one state to the current program: $1.3 m
- Adding one district in a state where INHP is already being implemented: $121,300

# Investigation the Cost Implications of Changing the Basic Program Charageristics of the AIN-C/Honduras Program

| Costing Alternative Program Designs | Total Cost | Average Total Cost Per Child |
|---|---|---|
| #1: 15 children per community, rather than 25 | 681,362 | 21.2 |
| #2: 35 children per community, rather than 25 | 681,362 | 12.1 |
| #3: 2 monitors per community rather than 3 | 642,108 | 14.6 |
| #4: Without curative care trainings or medicines | 514,335 | 11.7 |
| #5: Without supplements and medicines | 601,233 | 13.6 |
| #6: Monitors are paid 5.45 Lps. (US$0.33) per hour, rather than nothing | 819,750 | 18.6 |

# Costs Analysis to Inform Policy Making

## Vitamin A Fortification versus Supplementation Programs, The Philippines 1998



# The Potential of Cost Studies:

- Better understand the functioning of programs
- Clarify and standardize the activities and expectations of program managers and implementers, and thereby improve program effectiveness
- Provide Insight into how to reduce costs and improve efficiency
- Be a practical aid in planning, budgeting and the development of work plans for the program
- Provide a useful tool for improving administrative capacity
- Be used to conduct simulations—to investigate how potential changes in the program will affect costs

To maximize the usefulness of cost analysis for improving micronutrient program performance, **the preferred approach is to employ economic analysis and the ingredients approach combined with ABC.**