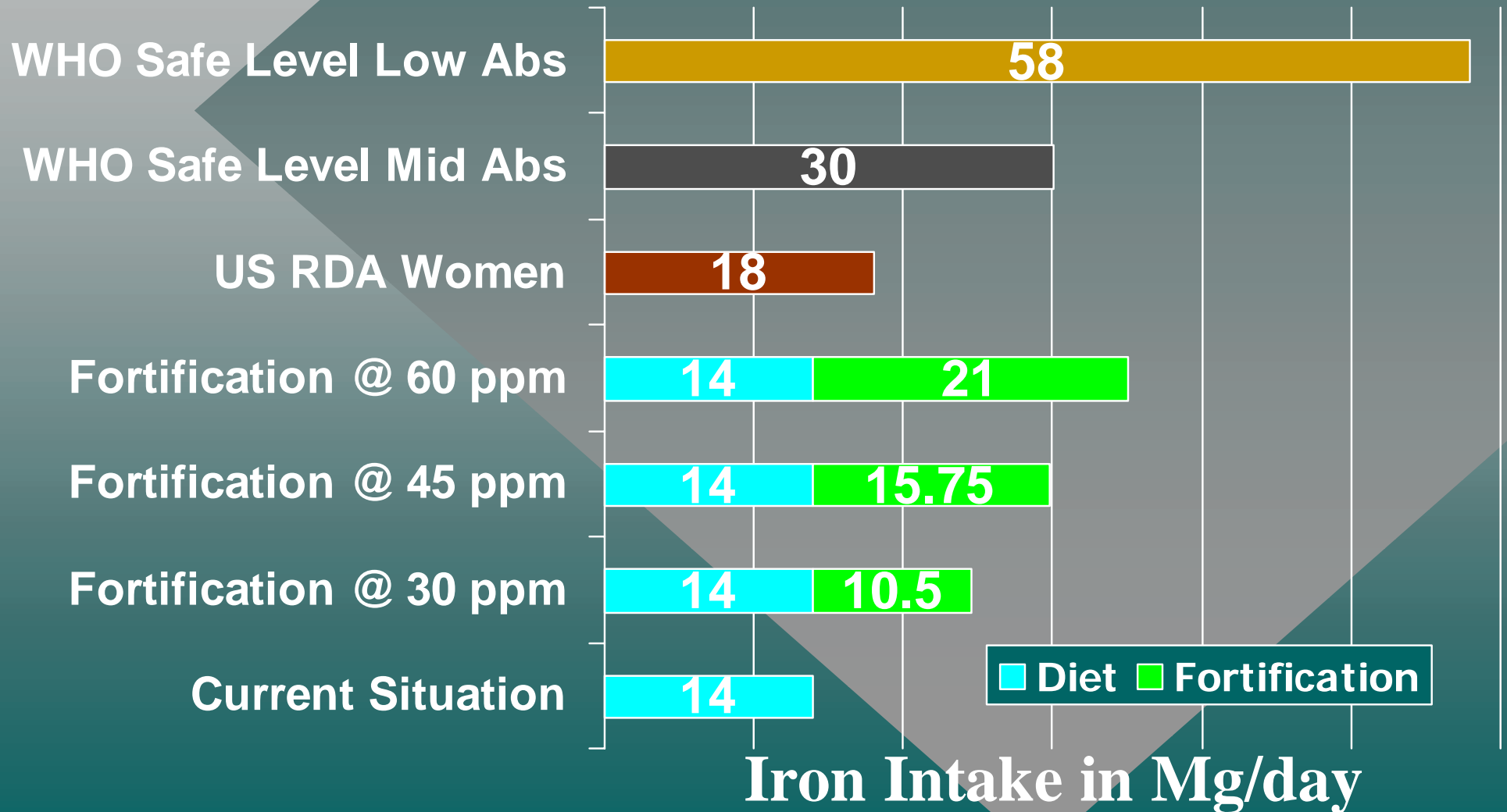


**Some Calculations:
Options for Fortification
Levels, Standards of
Sufficiency and
Projected Impacts**

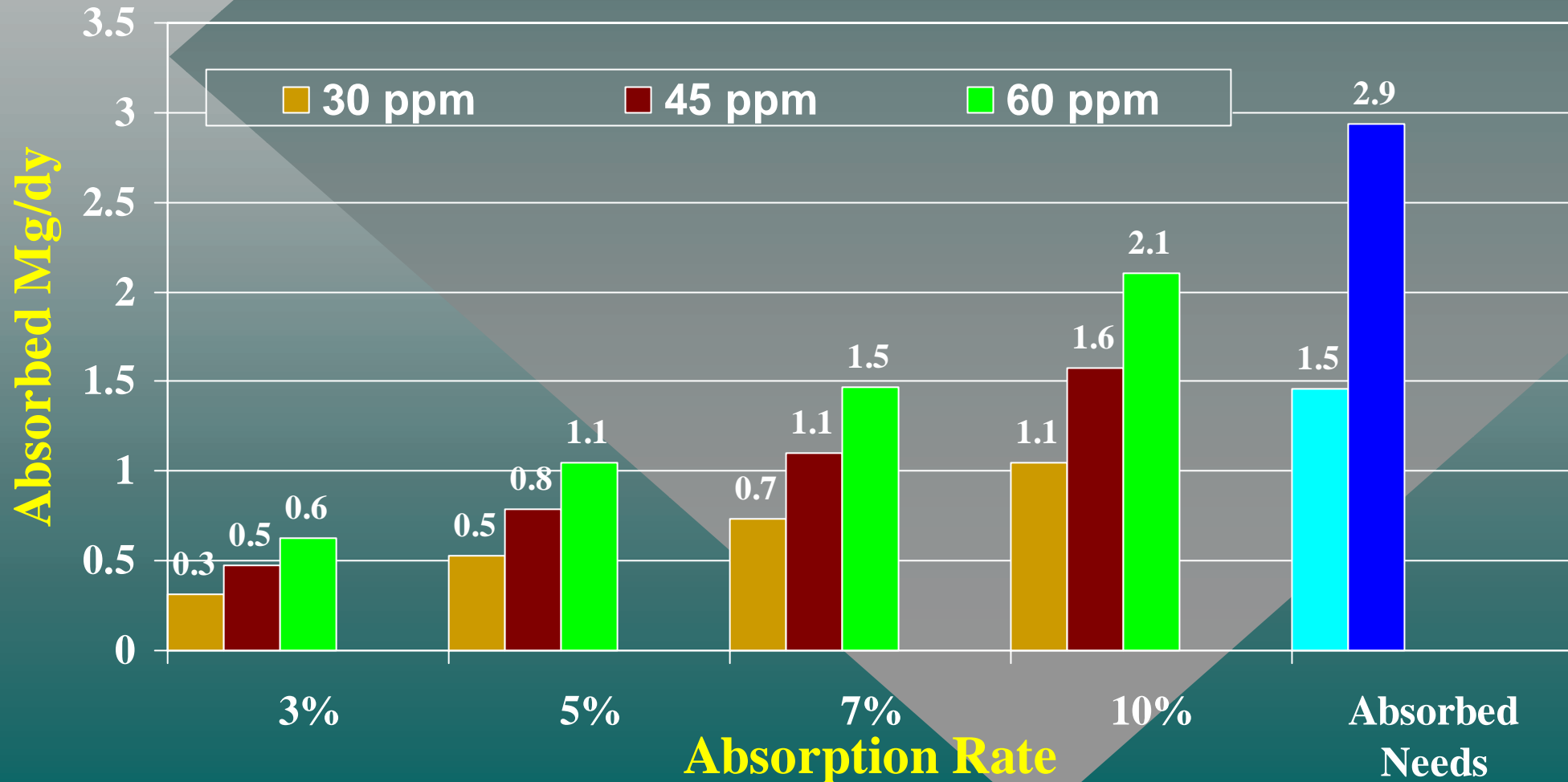
Fortification Levels and Standards

Dietary Iron Intake w/ 350 g/dy flour



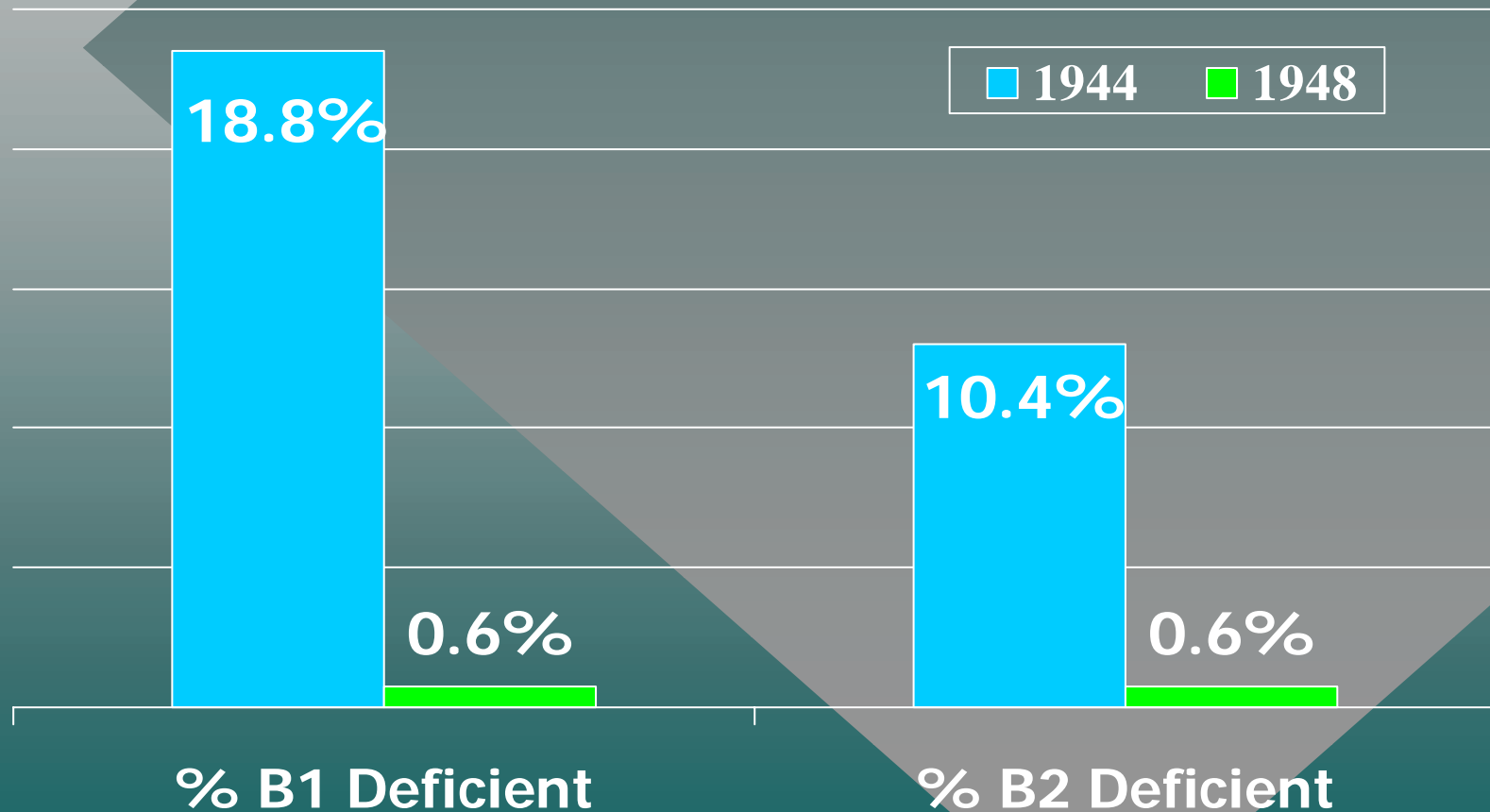
Fortification Levels and Standards

Absorbed Iron w/350 g/day flour



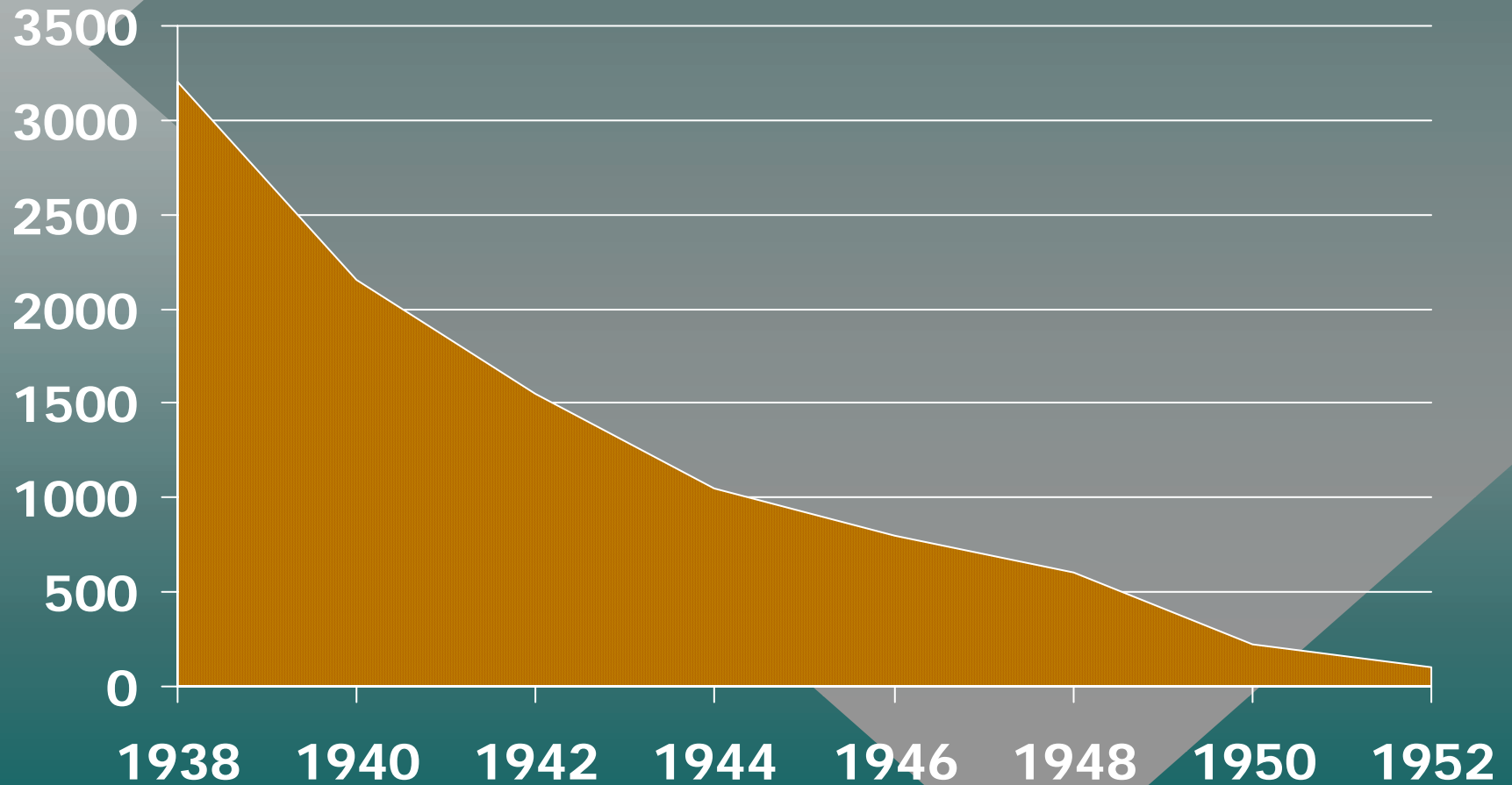
Targeting Stakeholders

Issue: Effectiveness Vitamin B Deficiencies in Canada

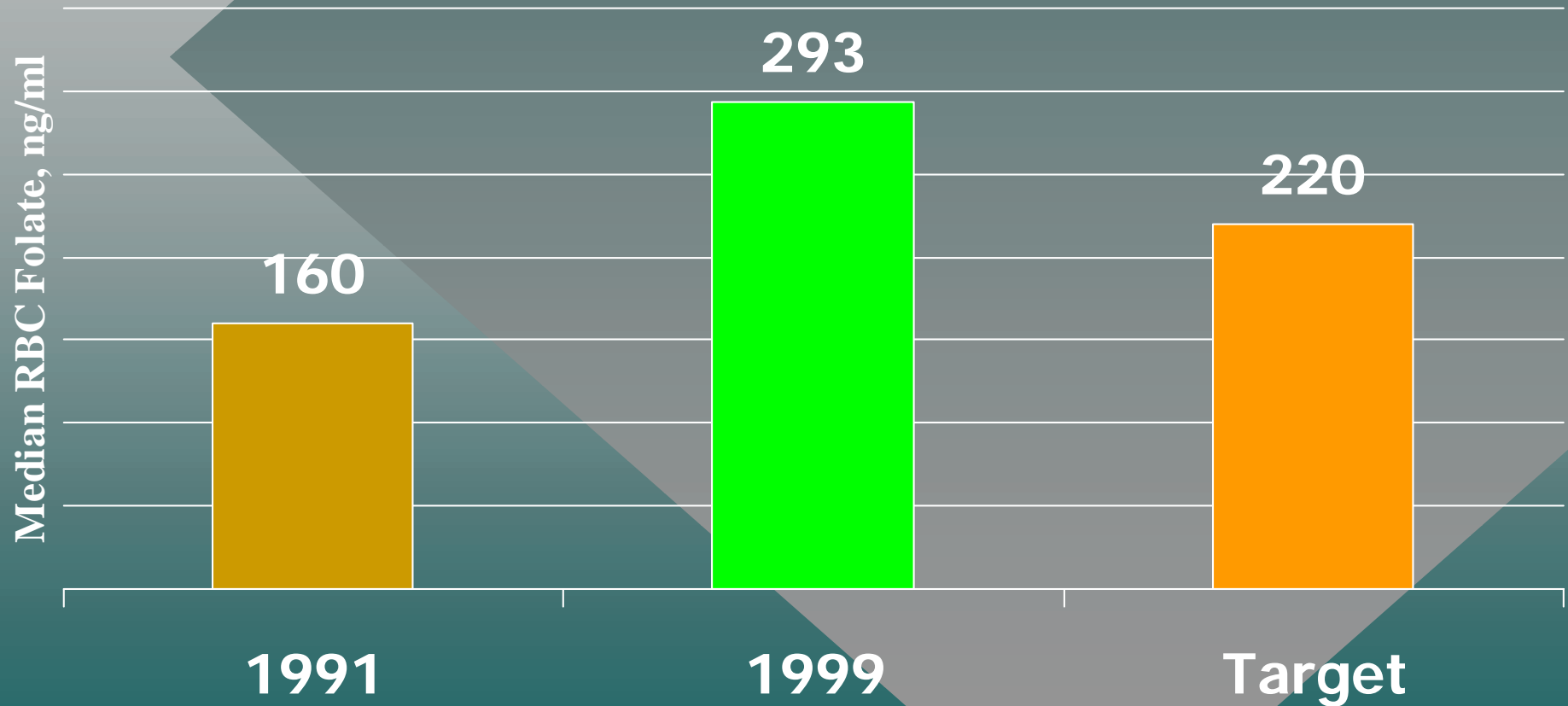


Issue: Effectiveness

Deaths from Niacin Deficiency in USA

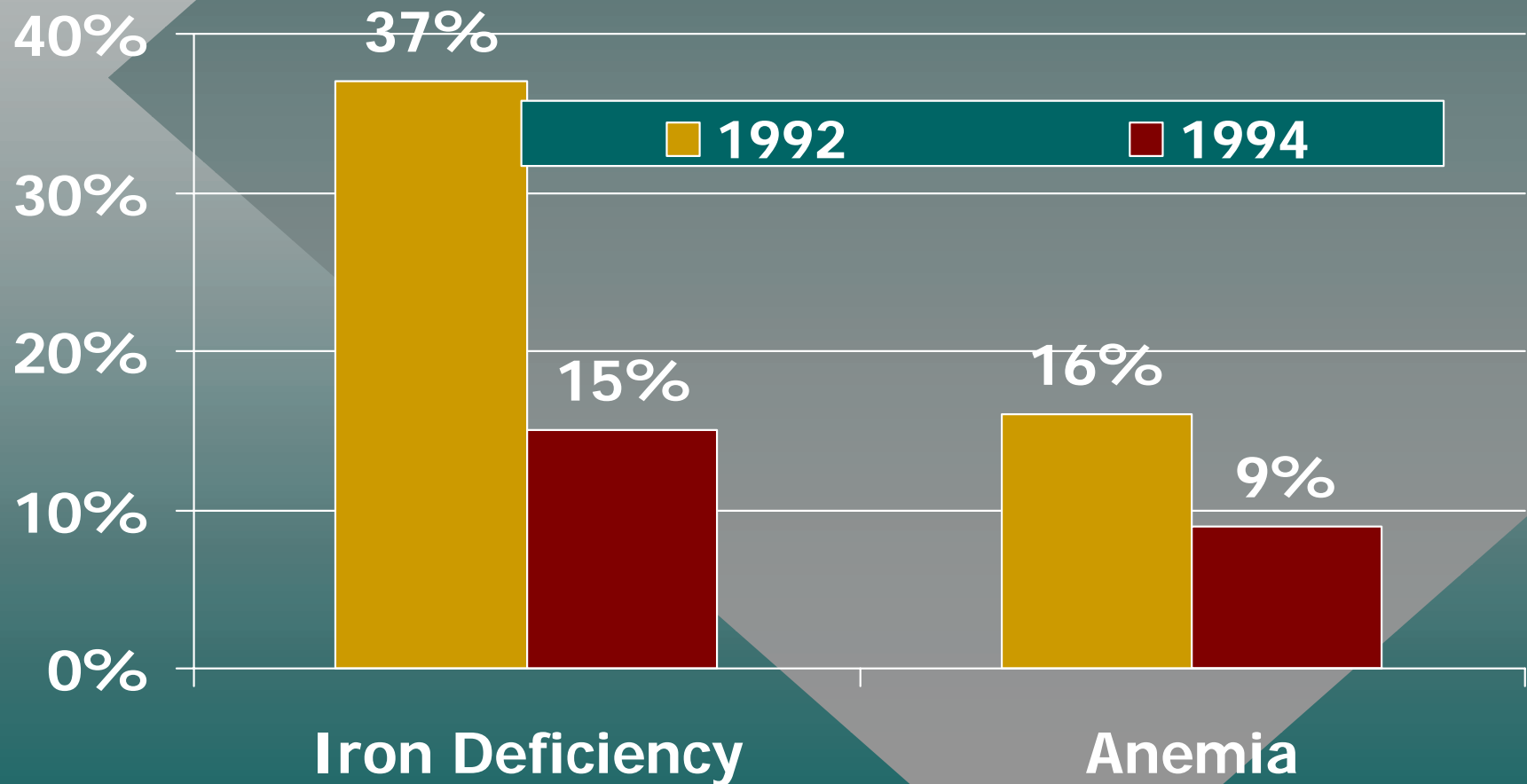


Issue: Effectiveness Folic Acid Deficiency in the USA



Fortification Begins mid-1997

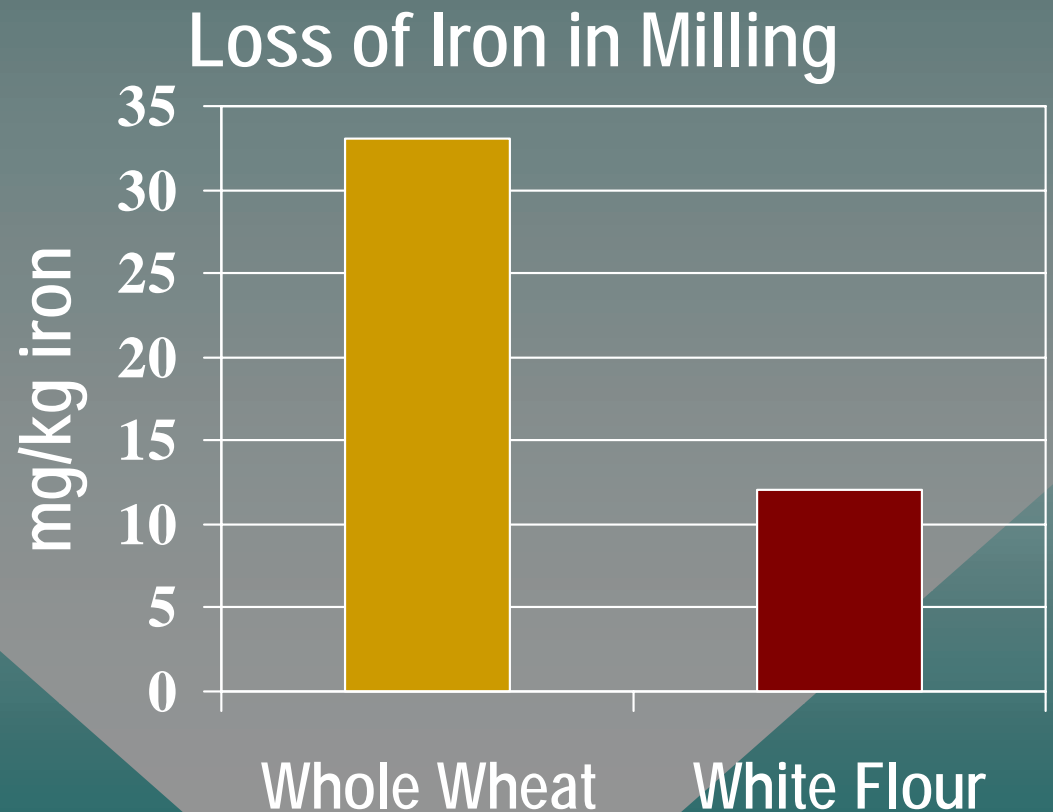
Issue: Effectiveness Anemia and ID in Caracas, Venezuela



Issue: Product Integrity

Adding “Artificial” Compound

- Iron is Natural to Whole Wheat @ 33 mg/kg.
- About 2/3rd's of Natural Iron is Lost When Milling White Flour
- Adding Iron is *Restoring* a Nutrient Lost in Milling.



Issues: Safety

Thalassaemia & Iron Fortification

WHO, 1998

- “Those suffering from thalassaemia major are not thought to be at greater risk of iron overload by fortified flour...”
- “No reason to believe that flour fortification will have any significant adverse impact on those individuals suffering from thalassaemia”

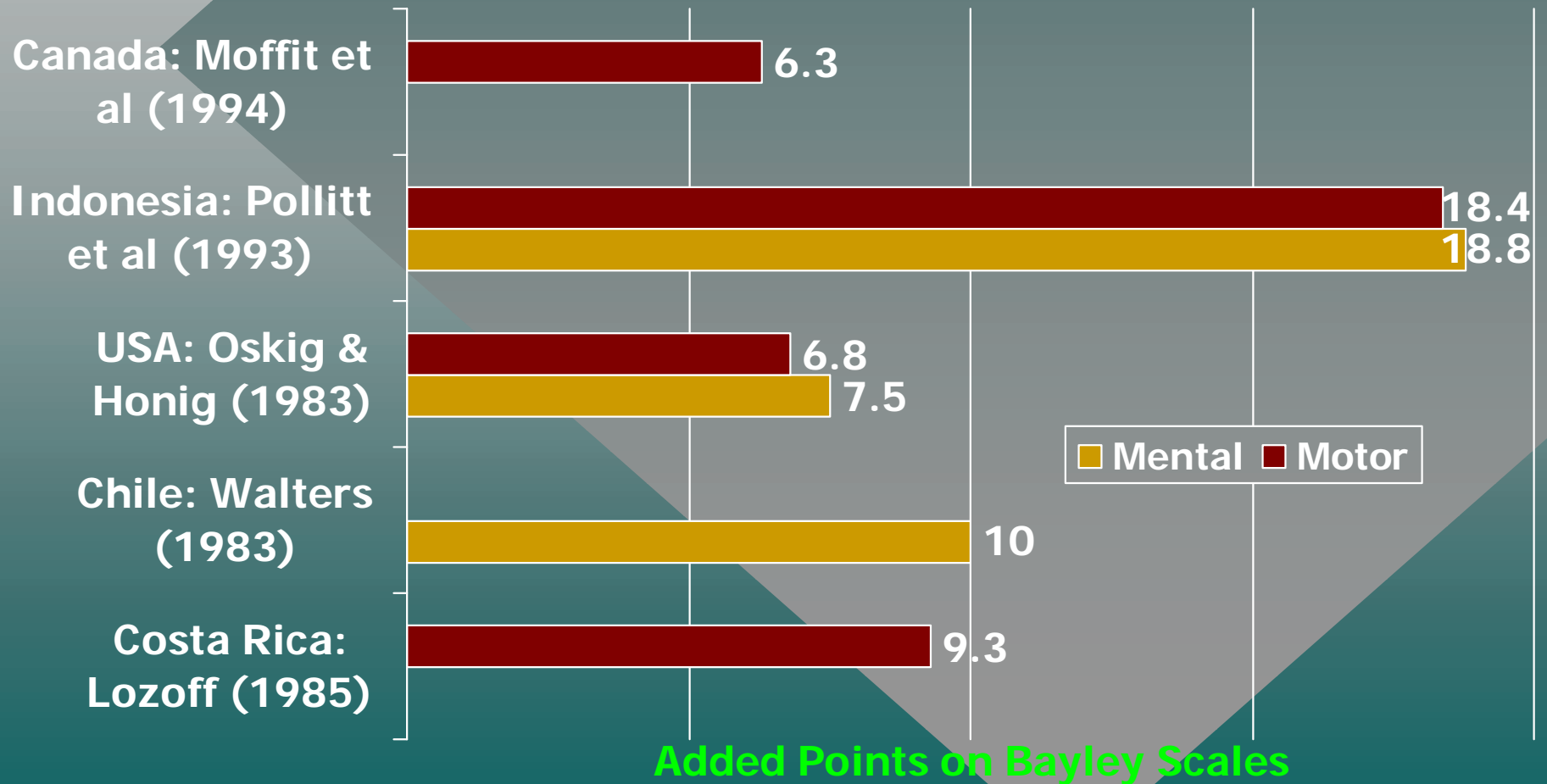
Issues of Consumer Acceptance

- Presentation of the Global Experience
- Regional Experience in Oman, Bahrain, I.R. Iran and Saudi Arabia
- Expert & Consumer Test Panels in Jordan and Egypt report no negative effect on iron on bread

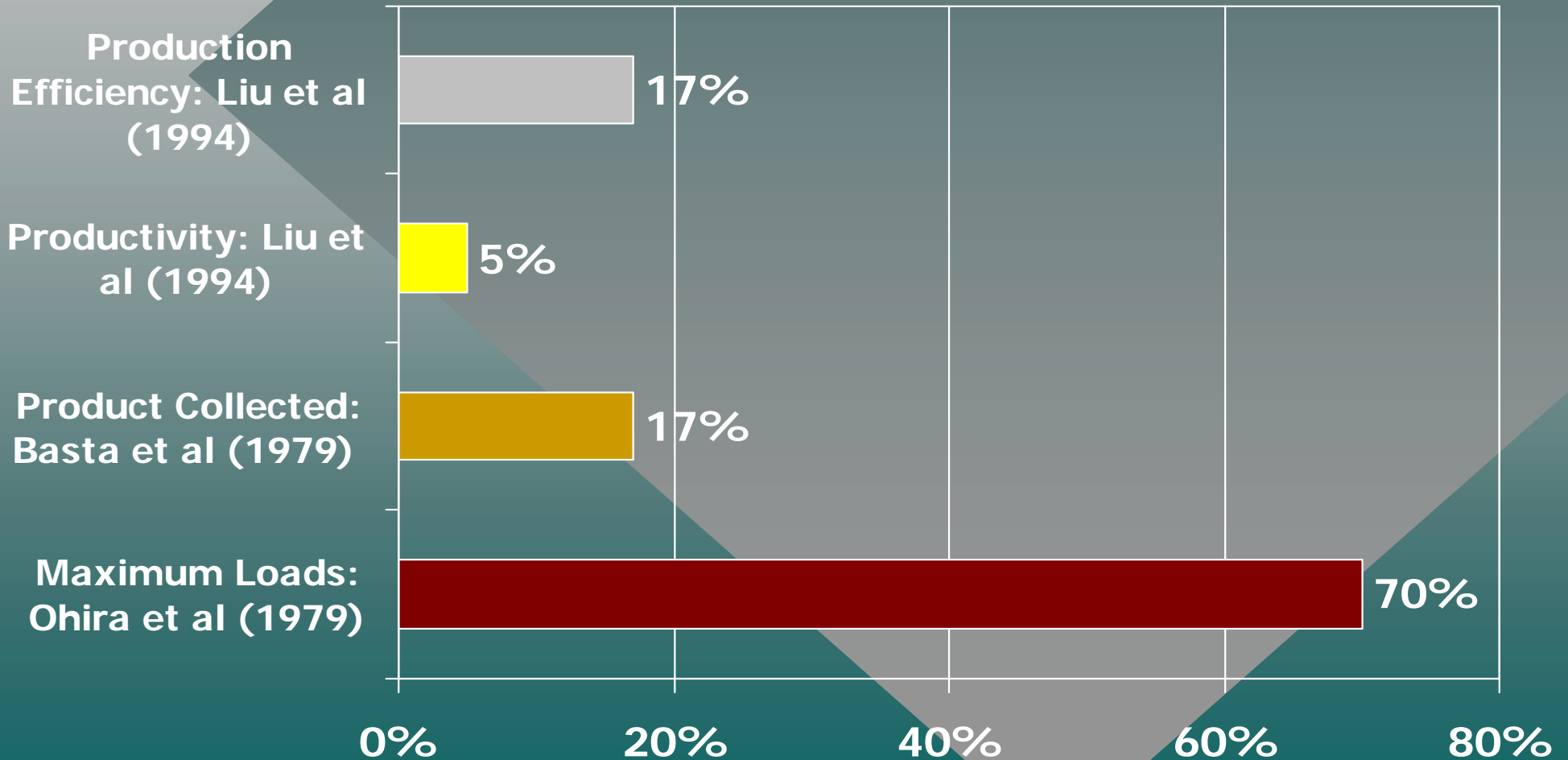
Issue: Benefits: Understanding of Impacts

- Associated with Reduction in Maternal Mortality
- Low Birth Weight & Reduced Child Growth
- Decreased Cognitive Development
- Inferior School Performance
- Less Strength and Endurance Among Adults
- Productivity and Performance Deficit

Cognitive Impact of Improved Iron Status in Children



Productivity Increase with Improved Iron Status



Issue: Cost Per Person Costs are Low...

	Per Person/yr	
	Cons. Kg	Cost
Lebanon	123	\$0.07
Jordan	157.8	\$0.09
Yemen	119.4	\$0.07
Syria	180.3	\$0.10
Morocco	167.9	\$0.09
Egypt	146.5	\$0.08
Iran	159.9	\$0.09
Pakistan	135.9	\$0.07

...But Total National Costs can be High

	Per Person/yr		National/yr	
	Cons. Kg	Cost	Cons. MT	Cost
Lebanon	123	\$0.07	422,782	\$232,530
Jordan	157.8	\$0.09	755,142	\$415,328
Yemen	119.4	\$0.07	2,103,285	\$1,156,807
Syria	180.3	\$0.10	2,844,974	\$1,564,736
Morocco	167.9	\$0.09	4,924,924	\$2,708,708
Egypt	146.5	\$0.08	9,770,506	\$5,373,778
Iran	159.9	\$0.09	11,070,585	\$6,088,822
Pakistan	135.9	\$0.07	18,696,672	\$10,283,170

Response:

% Market or Govt Budget (Jordan)

- % Retail of Bread/kg
0.137%
- % 7 yr Annual Food Index **1.1% (WB 4.4%)**
- % MOH Expenditure/cap **0.16% (\$31 pcap/yr)**

Cost Benefit & Value

- Ross/Horton Tool:
Conservative
Economic Impact and
Available Benefits

Ross/Horton Tool: Conservative Summary of Economic Impact Studies

- **.5 SD** Lower Cognitive Scores in Children due to Anemia cause Future Earnings Losses of **5%**
- **1%** Less Productivity of Blue Collar Workers
- **12%** Less Productivity Heavy Manual Laborers in areas such as agriculture and construction
- Not including: increased health care costs, loss of white collar capacity, economic consequences of mortality, morbidity and other health impacts

Worksheet for National Economic Impact of Anemia

National Data		Prevalence		
Country	Population	Child %	Male %	Female %
EMRONIA	10,000,000	30	5	30

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Female % GDP	Agric % GDP	BC % GDP	GDP Per Capita	
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ECONOMIC LOSSES DUE TO IRON DEFICIENCY

Cognitive	Blue Collar	Labor	Per Cap	Total loss
\$6.00	\$0.26	\$1.48	\$7.74	\$77,415,000

Issue: Value & Cost Benefit Worksheet for National Costs Example EMRONIA

Number of Mills	10
Total Metric Tons Per Year Milled	1,500,000
Annual Plant Costs (amortized)	\$10,000
Premix Costs @ US \$0.50/MT	\$750,000
Total Production Costs	\$760,000
Government Monitoring Costs @ 5%	\$38,000
Total Estimated National Cost	\$798,000

Cost Benefit Example EMRONIA

	Losses	
Total Loss of Economic Activity		\$77,415,000.00
	Investment	
Cost of Flour Fortification Program		\$798,000
	Economic Benefit	
Reduce Anemia & Economic Loss by 50%		\$38,707,500
	Return on Investment	
Dollar Returned for Dollar Invested		\$48.51
Annual Percentage Return		4851%

In a World of Competing Priorities...

... our job is to identify the channels, messengers and messages that create value for an investment in anemia reduction, flour fortification and better health.