East Central and Southern African Health Community (ECSA-HC)

Consumption considerations in formulating existing standards: ECSA example

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USAID FROM THE AMERICAN PEOPLE

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AED Ideas Changing Lives

Setting the Goals of a Mass FF programme

Step 1: Selecting the Proper Food Vehicle for Mass Fortification

Step 2: Defining the Dietary Objectives

Step 3: Finding the Appropriate Combination of the Food Vehicles

Step 4: Estimating Usual Intakes of the Fortification Vehicles

Step 5: Determining the Feasible Fortification Levels (FFL)

Setting the Goals of a Mass FF programme cont'd

Step 6: Defining the Acceptable Allowable Cost

Step 7: Assessing the Nutritional Impact and Selecting the Levels of Addition

Step 8: Estimating the Production Parameters

Step 9: Calculating the Regulatory Parameters

Step 10: Formulating the Premix

Setting the Goals of a Mass FF programme

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Estimating Consumption Patterns

- Ideally, need to determine consumption profile of the fortification vehicles for each of the age and gender groups as well as for geographical and socio-economical groups

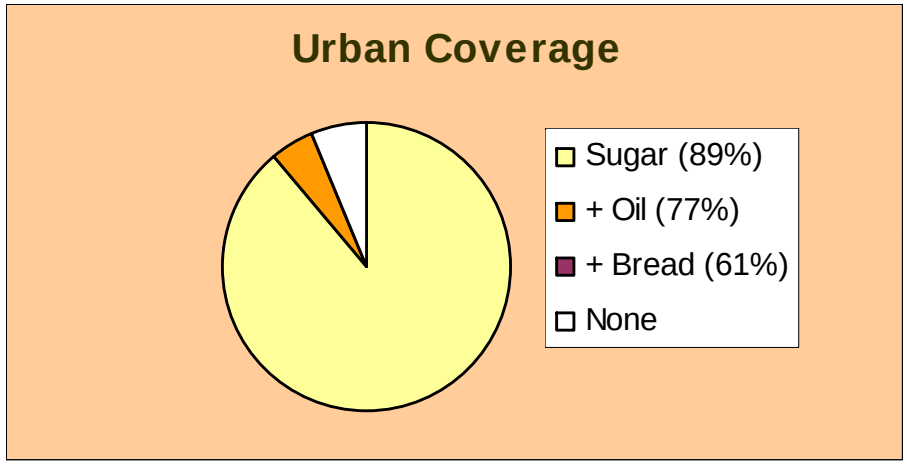
- Sources of data:
  - Food consumption and dietary intake surveys
  - Household Income Expenditure Surveys (HIES) or Household Budget/ary Surveys
  - Food Balance Sheets

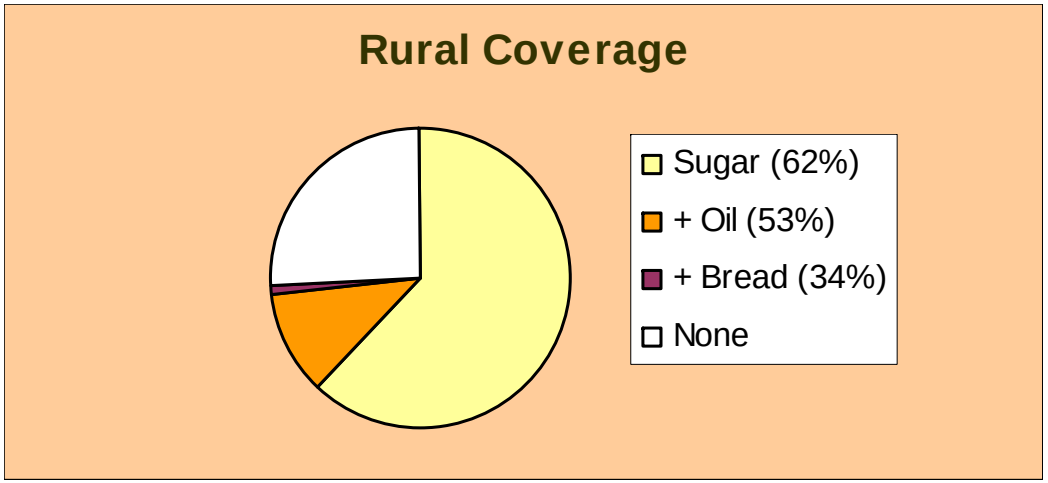
Consumption of Industrial Staples in the ECSA Countries

Food	*% Population*	*Usual Intake (g/day)*
Sugar	**60 – 95%**	**10 – 80**
Oil	**50 – 80%**	**4 – 25 mL**
Wheat Flour	**10 – 80%**	**25 - 270**
Maize Flour	**1 – 70%**	**35 - 350**

We tried to estimate coverage– HIES 2006

Example of Uganda





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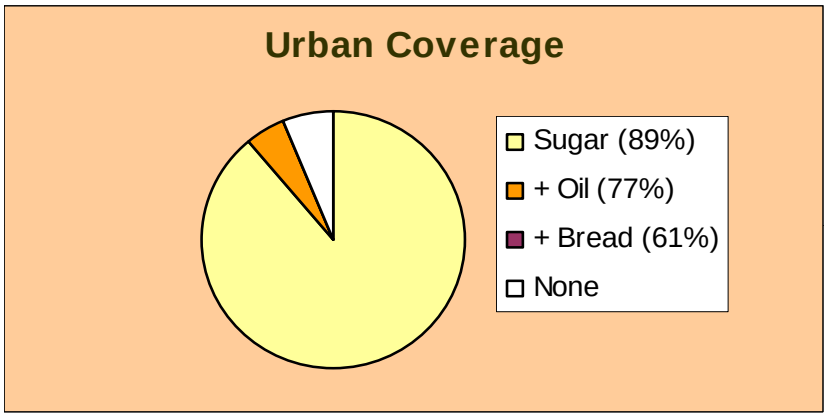
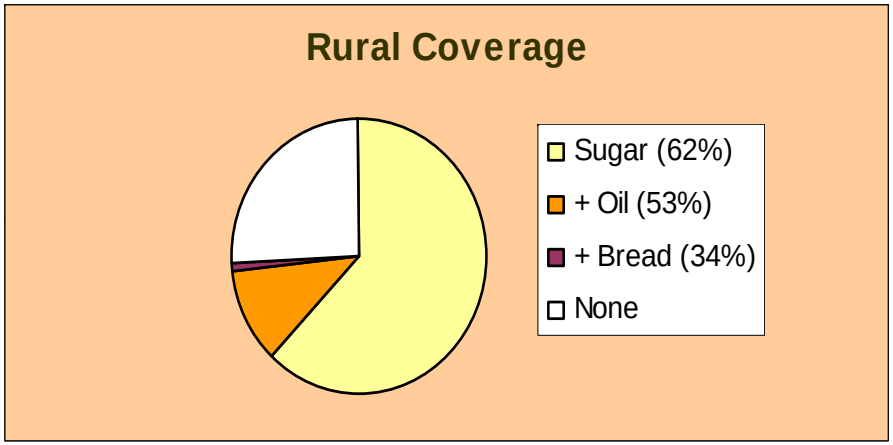
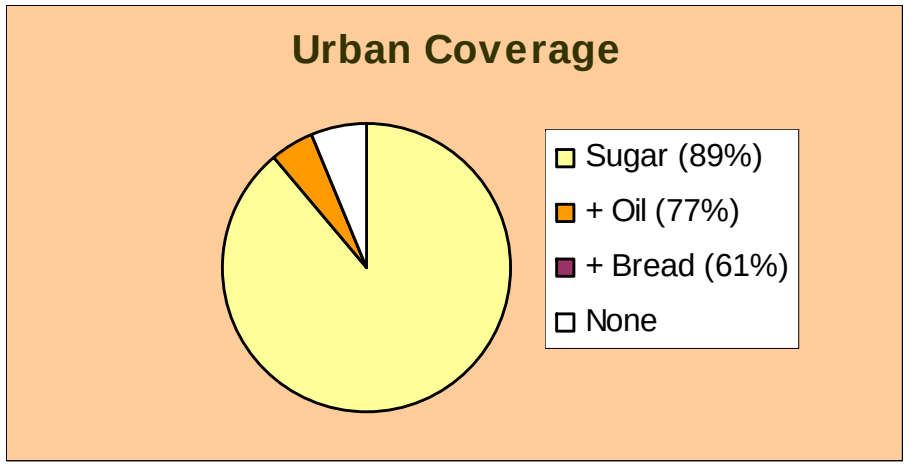


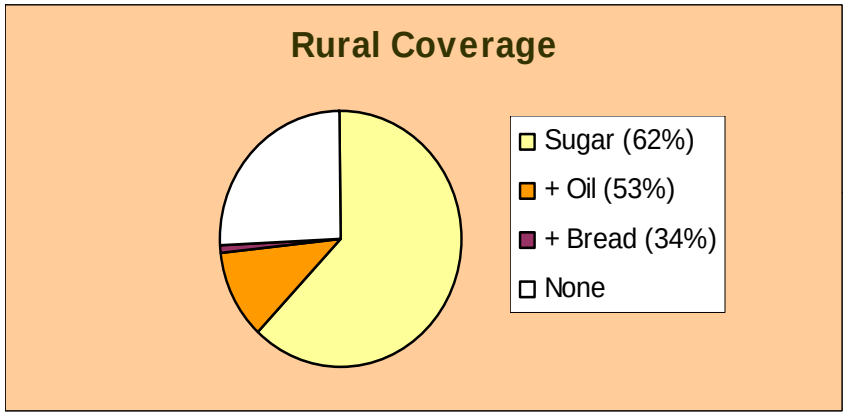


Is vitamin A needed in wheat flour?

We tried to estimate coverage– HIES 2006

Example of Uganda





Yes, if sugar is not fortified, and mainly for those countries where wheat flour intake is high and extended (Tanzania, e.g.)

Is vitamin A needed in wheat flour?

We used the best reference in Food Fortification, even before it was published.

"Food fortification is the practice of deliberately increasing the content of essential micronutrients in a food so as to improve the nutritional quality of the food supply and to provide a public health benefit with minimal risk to health."

WHO/FAO Guidelines on Food Fortification, 2006

In developing Standards, we made important considerations:

Diet + Intervention < UL for most individuals

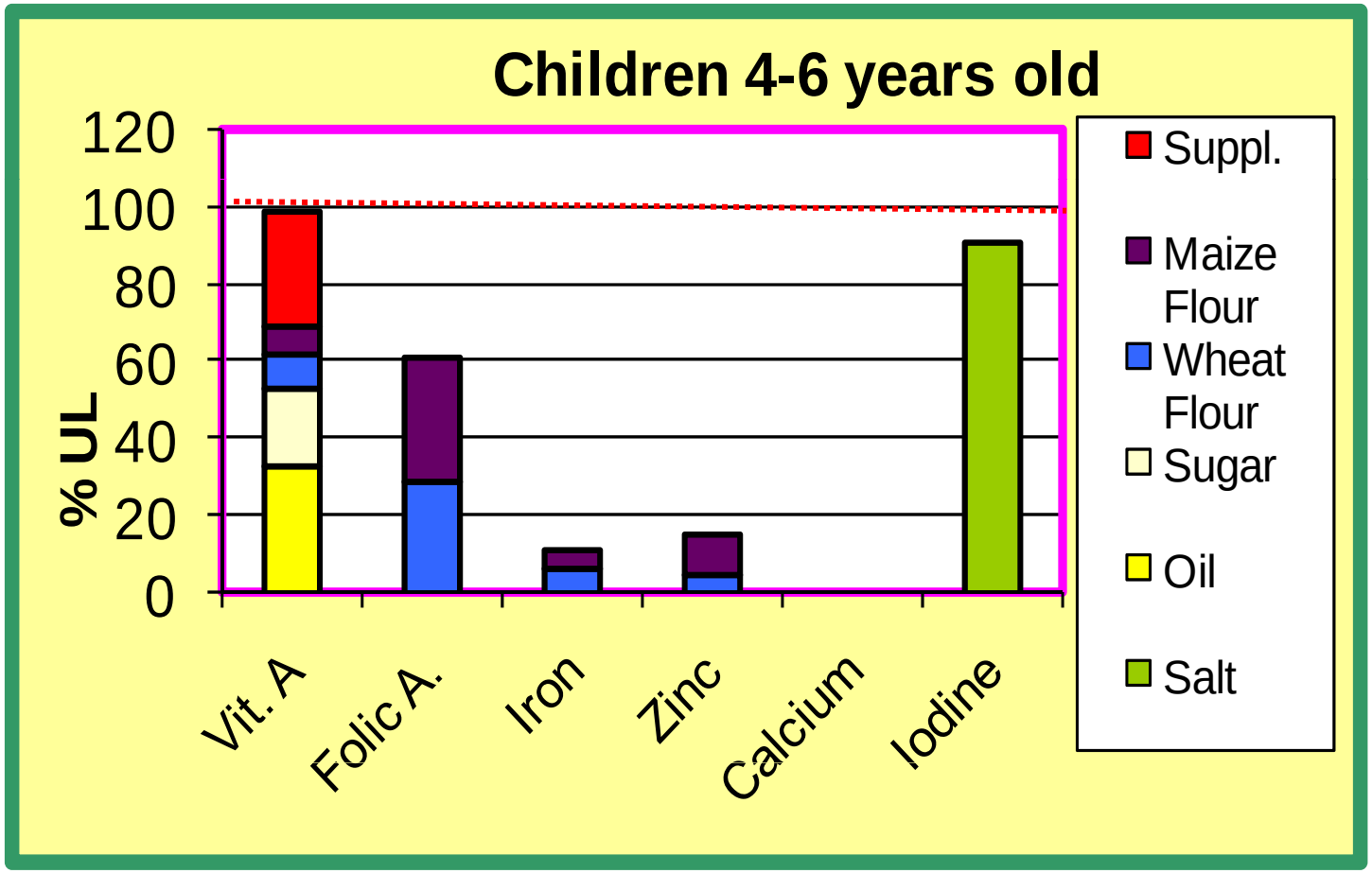
Criteria of Safety

Diet + Intervention > EAR for most individuals

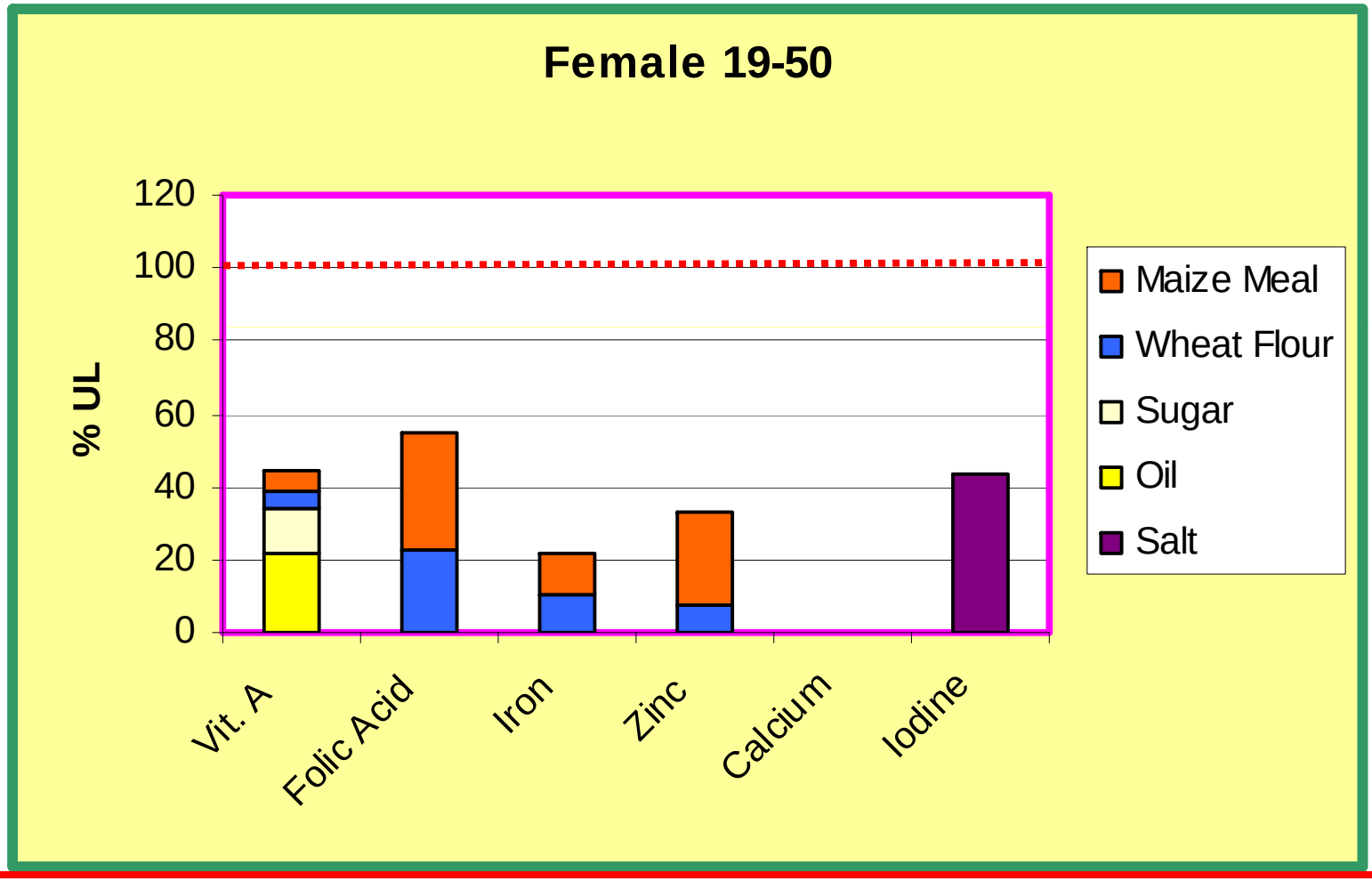
Criteria of Need

PROGRAM: $\sum$ fortified foods + supplements + others

Safety: We estimated the potential UL for the most vulnerable groups at P-95



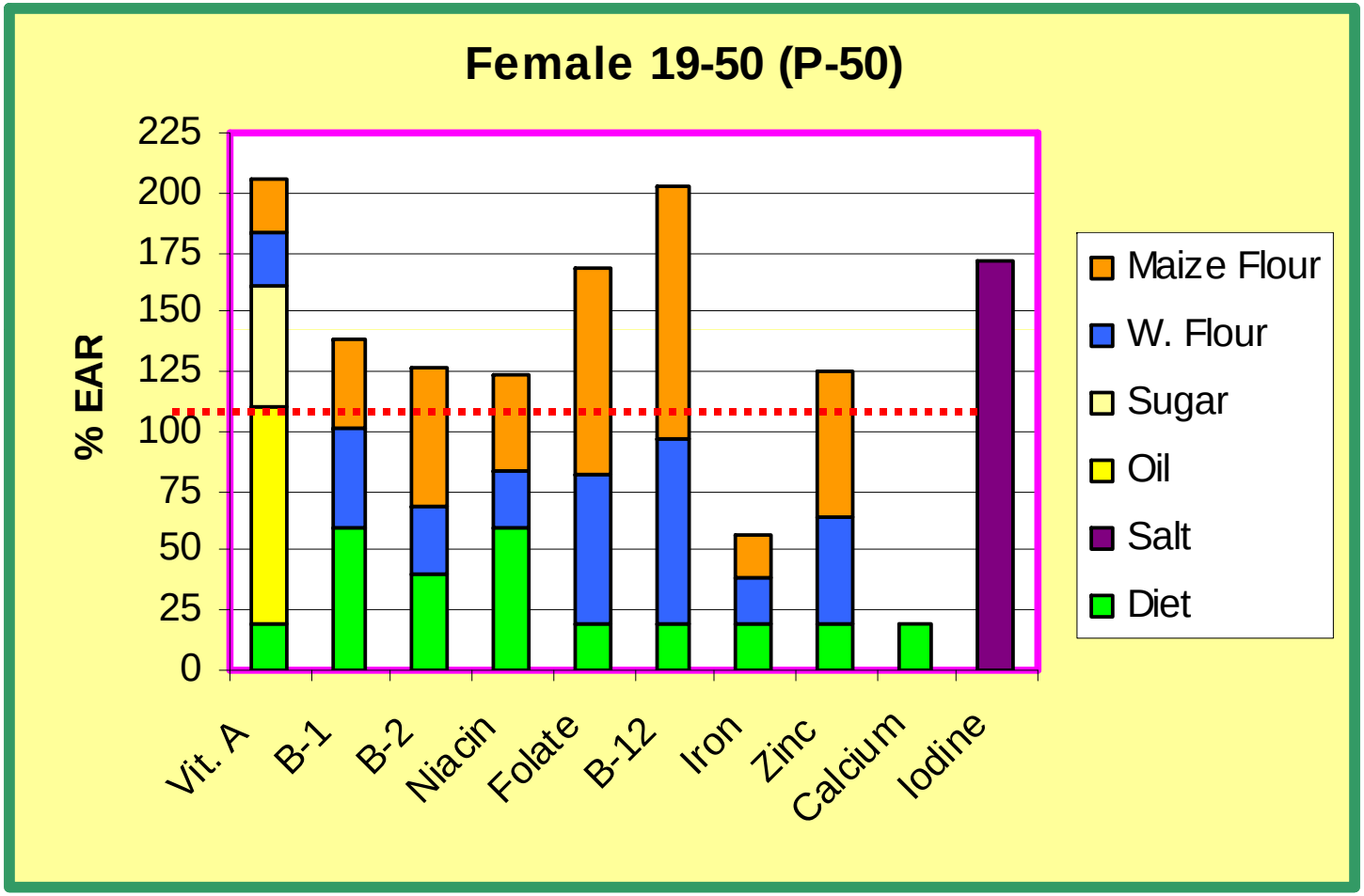
Safety: The Highest Supply (P-95) of Micronutrients in the ECSA Countries



Note:

Male consumption is usually 30-50% larger than female consumption, and UL are similar.

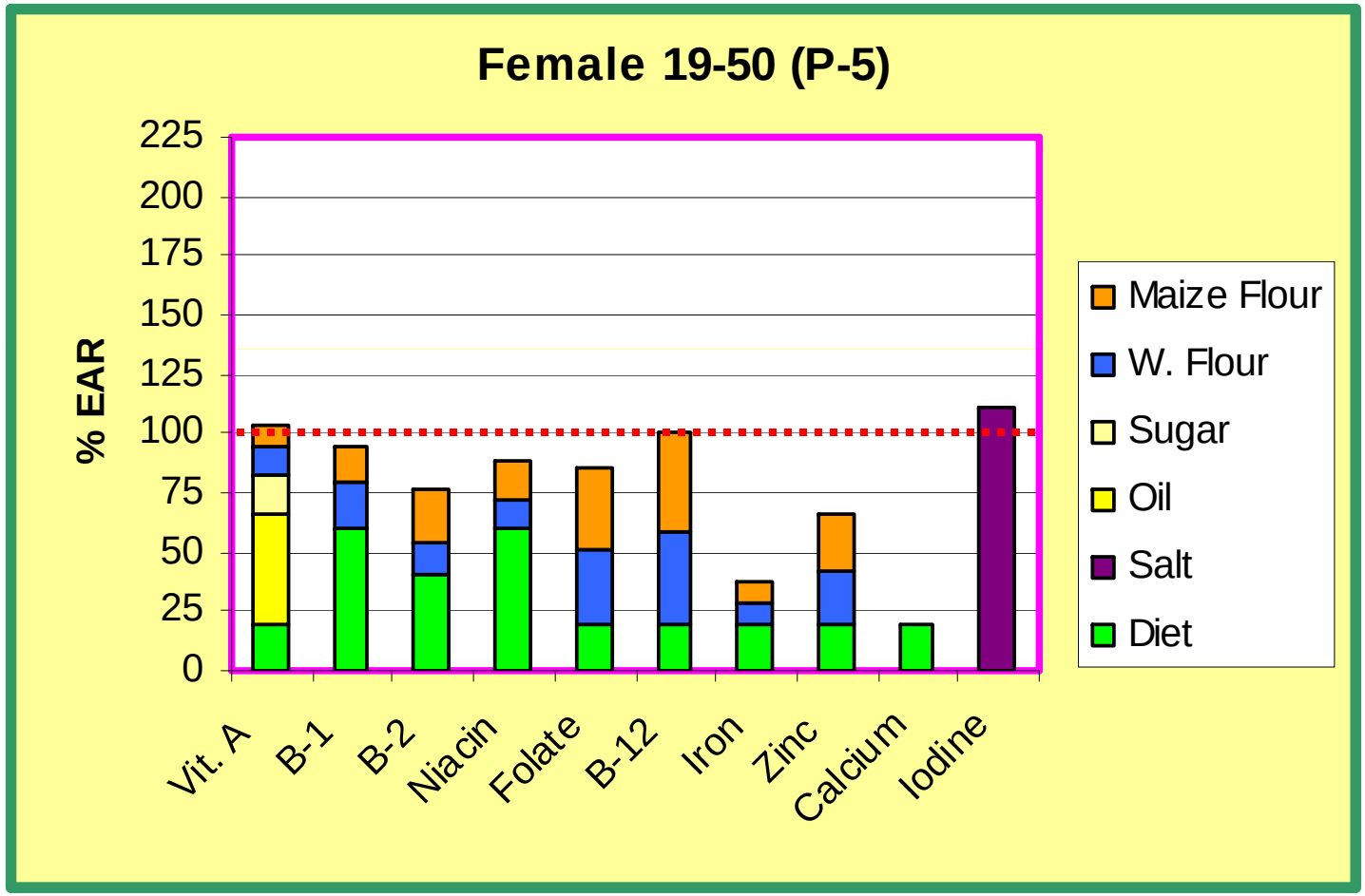
We estimated the potential benefit: the Median Supply of Micronutrients in the ECSA Countries



The intakes from the diet were assumed.

Non satisfied need: Iron and calcium.

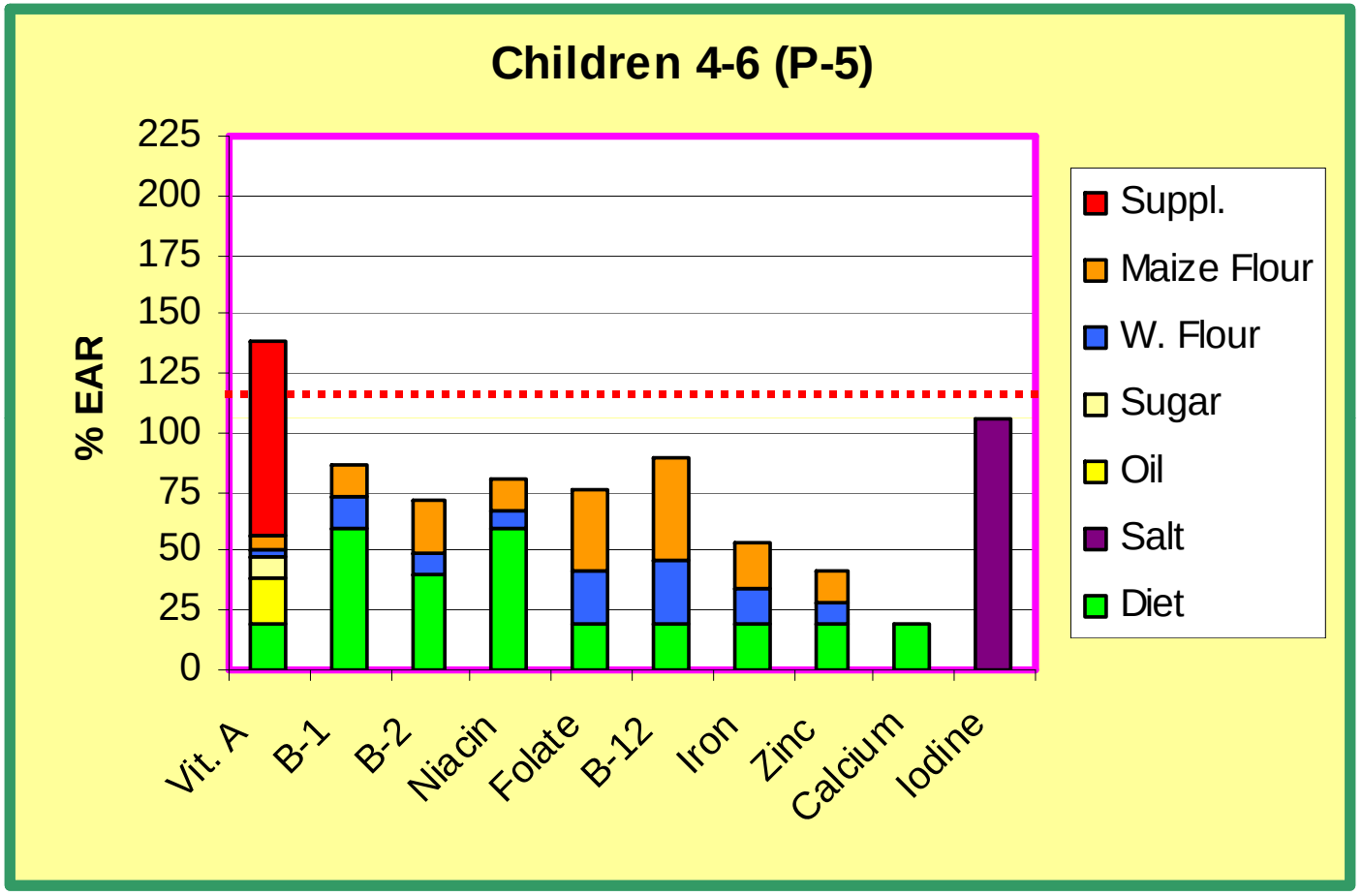
We estimated the benefit in those with the lowest consumption pattern (P-5)



The intakes from the diet were assumed.

Women (at P-5): Flours should also contain vitamin A.
High need: Iron and calcium;
Moderate need: B-2, niacin, folate, and zinc.

And the potential benefit in small children at P-5.



The intakes from the diet were assumed.

There are still need of Vitamin A supplementation, plus other interventions for: Iron, zinc, and calcium; and moderate additional amounts of: B-1, B-2 niacin, folate, and B-12.

Developed Guidelines on fortification levels (2007)

Vehicle	Nutrient / fortificant compound	Average Addition (mg/kg)	Factory Level (mg/kg)	Regulatory level (mg/kg)	
				Min	**Max**
Salt	Potassium Iodate	40	40±15	20	60
Oil	Vit. A (oily)	30	30±15	15	45
Sugar	Vit A (water disp)	10	10 ± 5	2	15
Maize flour*	Vit A and	0.5	0.5±0.2	0.2	1
	Iron (added; NaFeEDTA)	10	10±5	5	15
Wheat flour *	Vit A and	2	2±1	0.5	3
	Iron (added; Fumarate)	40	40±10	30	50

*Plus zinc, and vitamins of the complex B.

Estimated costs of fortification of wheat flour

Nutrient	Content (mg/kg)	Cost ($/MT)	% EAR*
Vit.B-12	0.015	0.63	32%
Folate	3.0	0.65	66%
Vit.B-1	13.0	0.39	48%
Vit.B-2	7.0	0.27	32%
Niacin	90.0	1.05	36%

Nutrient	Content (mg/kg)	Cost ($/MT)	% EAR*
Vit.A	3.0	1.60	33%
Iron (Fumarate)	40.0	0.76	8%
Iron (NaFeEDTA)	40.0	2.00	15%
Zinc (ZnO)	50.0	0.42	31%
Other expenses	-	2.30**	-

* For women of reproductive age with a daily flour intake of 50 g/day, and assuming a diet with low bioavailability for minerals.
** Total: $8/MT; premix: $ 14.50/kg for using 500 g/MT; $0.15/year per person; if fumarate is replaced for NaFeEDTA, then: Total cost $10/MT; premix $12.75/kg*** for using 700 g/MT; $0.18/year per person. *** less costly, because more diluted.

Conclusions

1. Principles of science are universal, solutions are local. Assessment of the nutrient intakes has been done in some countries and results should be used to review standards.
2. Impact of food fortification is due to correction of inadequate micronutrient intakes, and not to the simple consumption of the fortified foods.
3. Epidemiological impact is a function of the extension of the coverage of the fortified food and the magnitude of the additional intake (amount consumed x fortification level), both of which may be limited.
4. M&E should be a key component of FF program to continuously generate data, alongside the science to review programs.