

Nutrition Situation in Southern and East Africa

Donald (Diego) Rose

School of Public Health & Tropical Medicine
Tulane University
New Orleans, Louisiana, USA

**EC Food Security Seminar for Southern and East Africa
Maputo, Mozambique, 3-7 November, 2008**

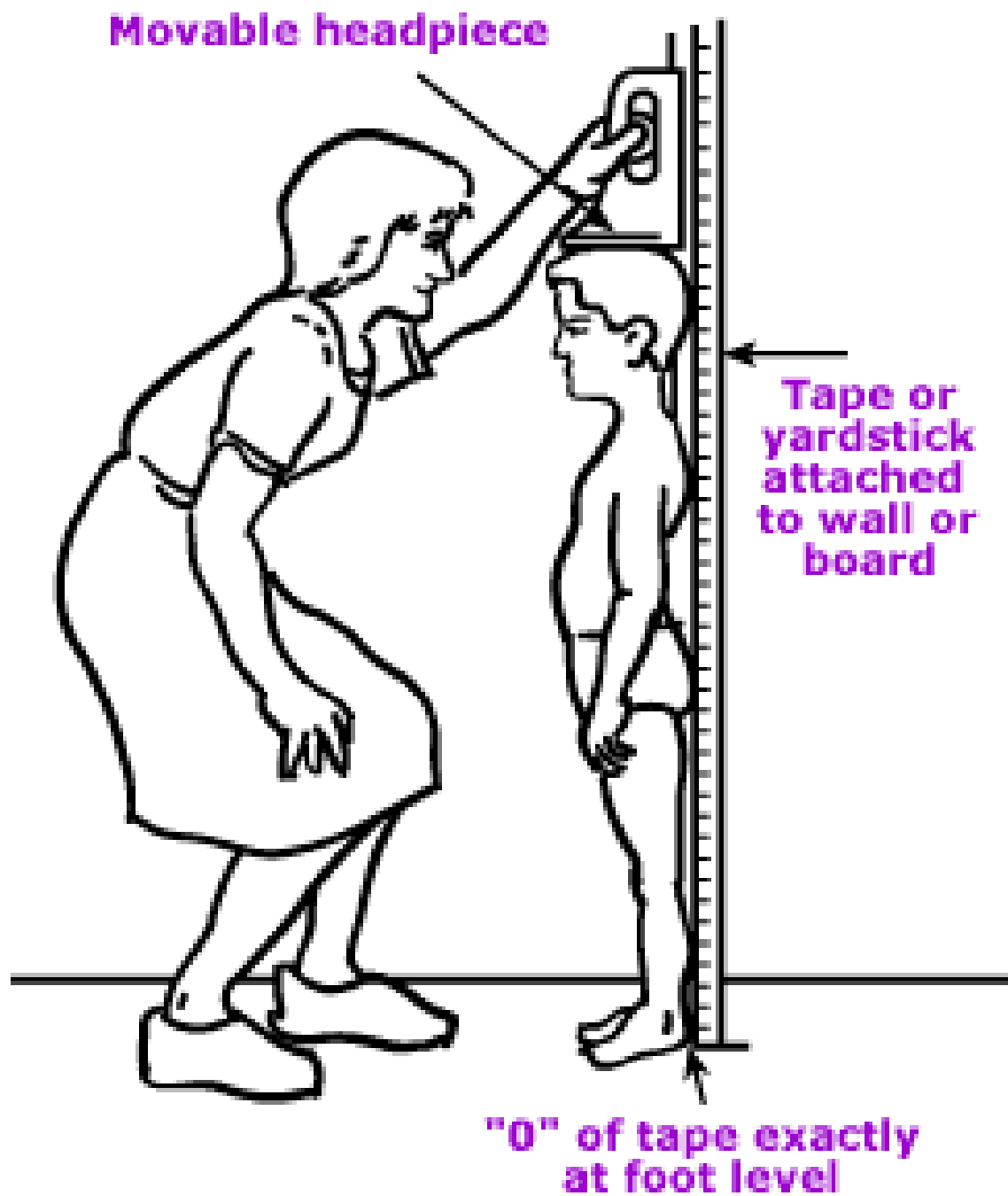
Outline

- I. Assessing nutritional status
- II. Nutritional status in S, E Africa
- III. Causal framework
- IV. Types of nutrition interventions
- V. Parting thoughts

I. Assessing Nutritional Status

Commonly used anthropometric indicators of undernutrition

Indicator	How measured (typical values)	Used as indicator for determining
Stunting, short stature, linear growth retardation	height for age (HA Z-score < -2)	chronic malnutrition
Wasting, thinness	weight for height (WH Z-score < -2)	acute malnutrition
Underweight	weight for age (WA Z-score < -2)	composite measure of stunting &/or wasting



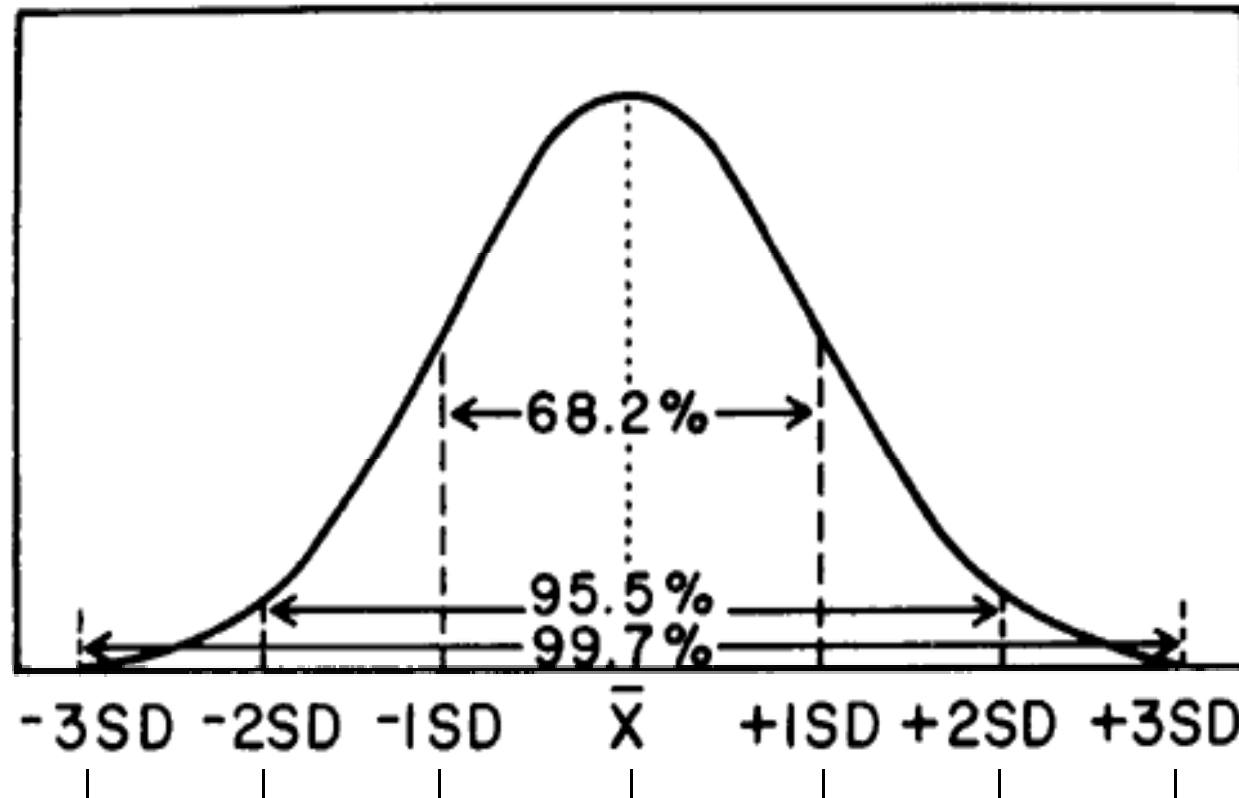


Commonly used anthropometric indicators of undernutrition

Indicator	How measured (typical values)	Used as indicator for determining
Stunting, short stature, linear growth retardation	height for age (HA Z-score < -2)	chronic malnutrition
Wasting, thinness	weight for height (WH Z-score < -2)	acute malnutrition
Underweight	weight for age (WA Z-score < -2)	composite measure of stunting &/or wasting
Low BMI (Body Mass Index)	BMI < 18.5	chronic energy deficiency in adults
Low arm circumference	MUAC < 13.5 cm (Mid-Upper Arm Circ)	acute malnutrition in emergency situations
Low birth weight	birthwt < 2.5 kg	intra-uterine growth retar- dation &/or prematurity

Example distribution of heights

25-month-old boys, bottom scale in cm



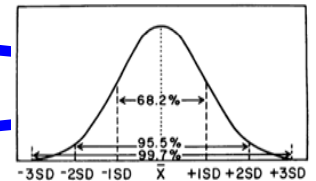
cm

76.7 79.9 83.2 86.4 89.7 92.9 96.1

Height-for-age z-scores (in cm) for boys, 24-36 months

WHO/CDC 1978 reference values

AGE	-3Z	-2Z	-1Z	MED	+1Z	+2Z	+3Z
24	76.04	79.22	82.41	85.59	88.77	91.96	95.14
25	76.69	79.94	83.18	86.43	89.67	92.91	96.15
26	77.34	80.64	83.94	87.25	90.55	93.85	97.14
27	77.98	81.34	84.70	88.06	91.41	94.77	98.12
28	78.62	82.03	85.45	88.86	92.27	95.68	99.09
29	79.25	82.72	86.18	89.65	93.12	96.58	100.04
30	79.87	83.39	86.91	90.43	93.95	97.47	100.98
31	80.49	84.06	87.63	91.20	94.77	98.34	101.91
32	81.11	84.73	88.35	91.97	95.58	99.20	102.82
33	81.71	85.38	89.05	92.72	96.38	100.05	103.72
34	82.31	86.03	89.74	93.46	97.17	100.89	104.60
35	82.91	86.67	90.43	94.19	97.95	101.71	105.47
36	83.50	87.31	91.11	94.92	98.72	102.53	106.33



WHO classification of malnutrition using Z-scores

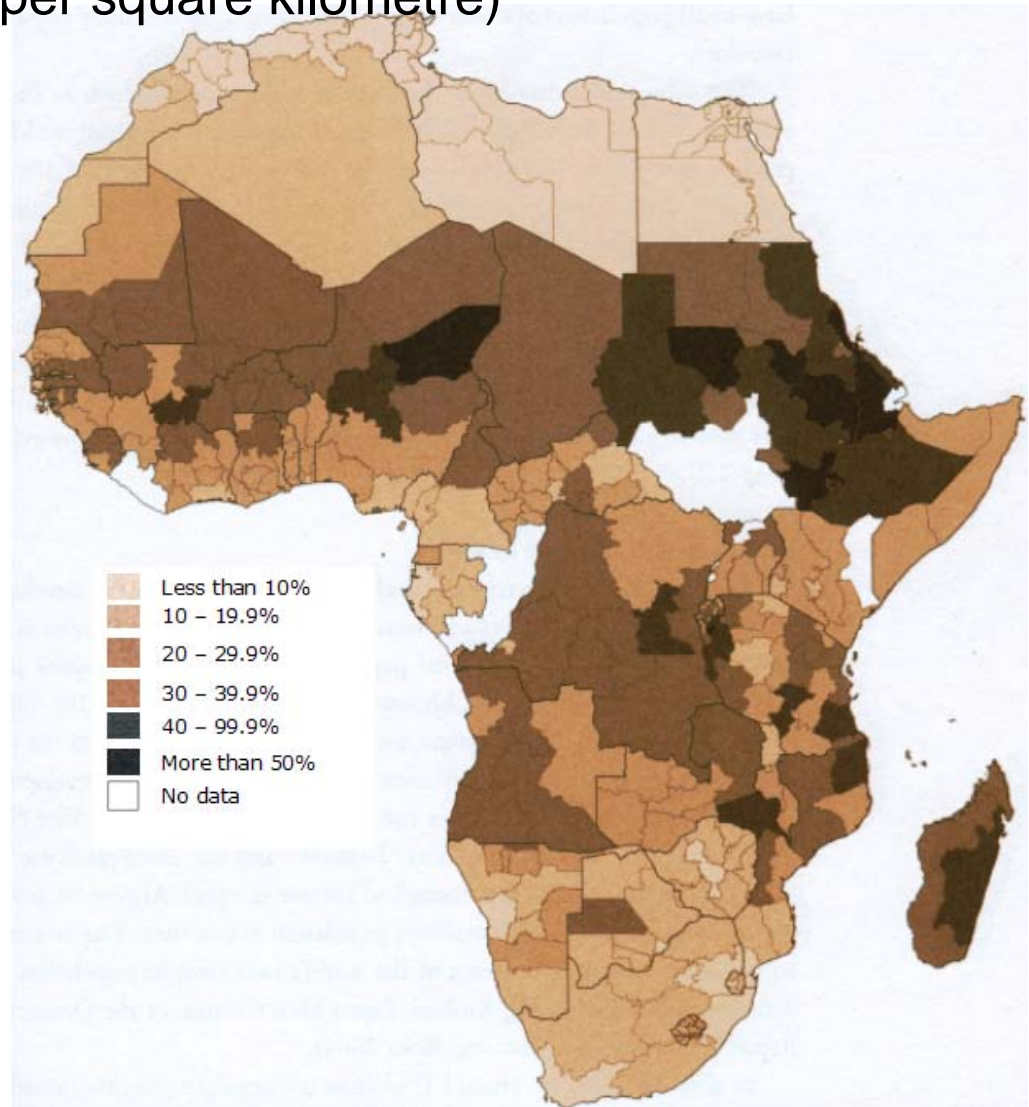
Cut-off	Classification
< -2 Z-score	Moderate malnutrition
< -3 Z-score	Severe malnutrition

II. Nutritional Status in Southern and East Africa

Distribution of Underweight Children in Africa

(Children per square kilometre)

Half of the approximately 32 million underweight children in Africa live in less than 10 percent of its sub-national administrative units.



Source: Millennium Project Hunger Task Force: Halving hunger: it can be done, 2005

Undernutrition rates in Southern and Eastern Africa

Country	Stunting (%)	Wasting Rate (%)	Underweight (%)
Angola	45	6	31
Botswana	23	5	13
Djibouti	26	13	18
Eritrea	38	13	40
Ethiopia	52	11	47
Kenya	30	6	20
Lesotho	46	5	18
Liberia	39	6	26
Madagascar	48	13	42
Malawi	48	5	22
Mozambique	41	4	24
Namibia	24	9	24
Sierra Leone	34	10	27
Somalia	23	17	26
South Africa	25	3	12
Sudan	43	16	41
Swaziland	30	1	10
Tanzania	38	3	22
Uganda	39	4	23
Zambia	49	5	23
Zimbabwe	27	6	13

Source: UNICEF global database on child malnutrition, <http://www.childinfo.org/undernutrition.html>, June 2008

Three main micronutrient deficiencies

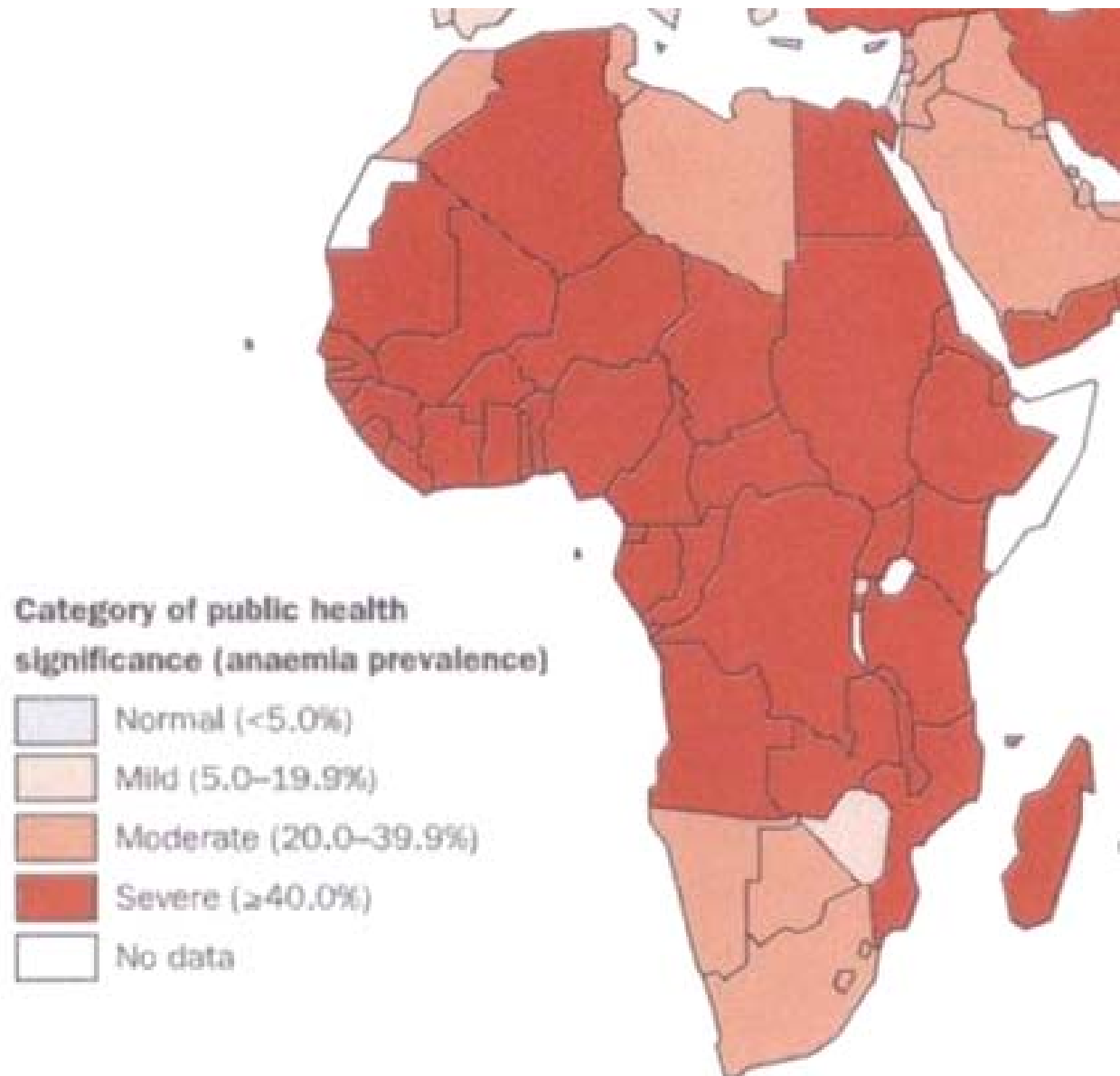
- Vitamin A deficiency (VAD)
 - Increased morbidity, mortality of infants, children, pregnant women
 - Impairs vision, growth of children
- Iron deficiency anemia (IDA)
 - Impaired psychomotor, cognitive development in children
 - Poor growth
 - Lower productivity, work performance in adults
- Iodine deficiency disorder (IDD)
 - Low birthweight, infant mortality
 - Impaired mental function, poor growth

Vitamin A deficiency in children Southern and Eastern Africa

Country	High Mort <5yr	Vit A Problem
Angola	YES	YES
Botswana	YES	YES
Djibouti	YES	YES
Eritrea	YES	YES
Ethiopia	YES	YES
Kenya	YES	YES
Lesotho	YES	YES
Liberia	YES	
Madagascar	YES	YES
Malawi	YES	YES
Mozambique	YES	YES
Namibia	NO	YES
Sierra Leone	YES	
Somalia	YES	
South Africa	NO	YES
Sudan	YES	YES
Swaziland	YES	
Tanzania	YES	YES
Uganda	YES	YES
Zambia	YES	YES
Zimbabwe	YES	YES

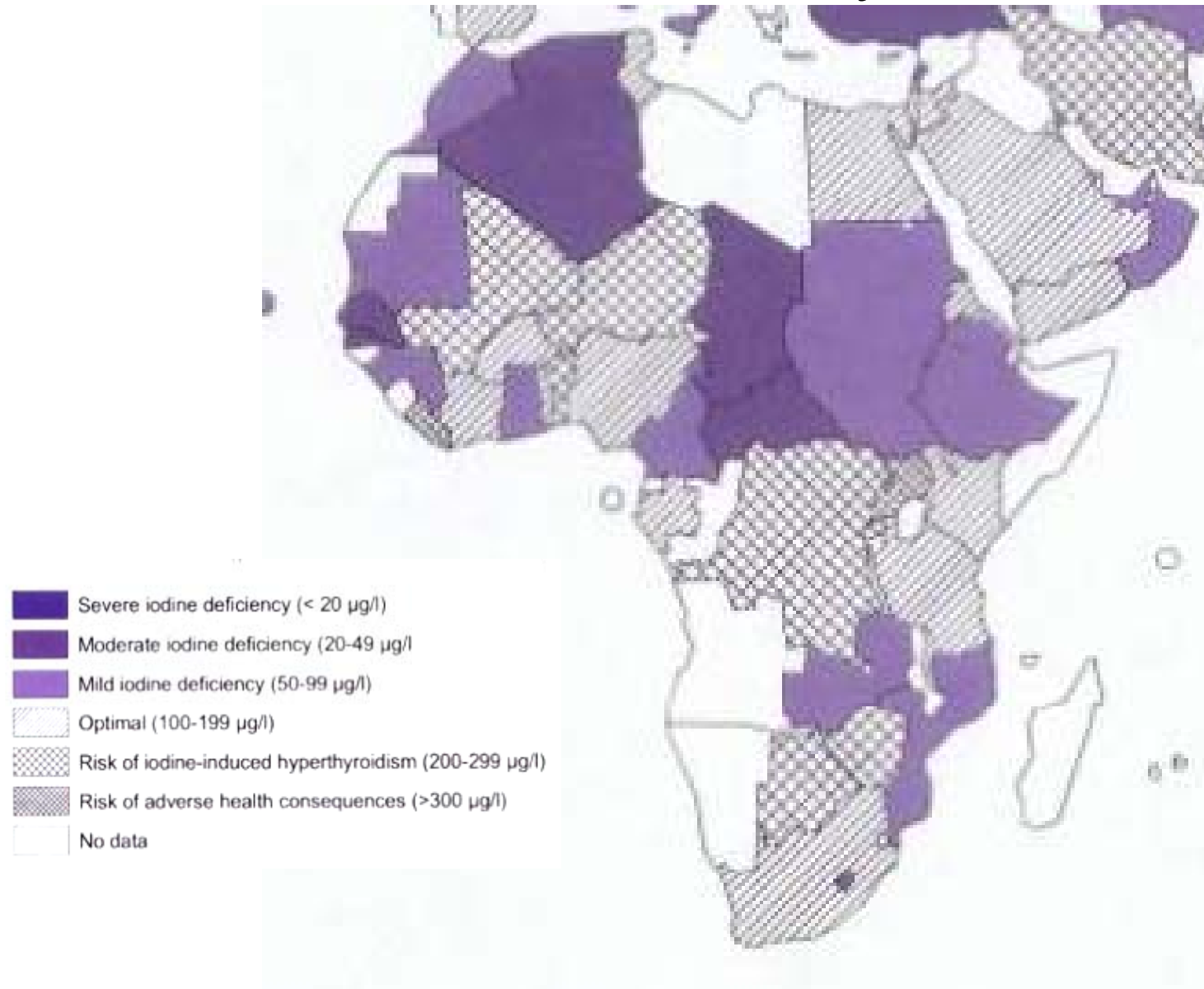
Source: UNICEF global database on child malnutrition, <http://www.childinfo.org/undernutrition.html>

Anemia among pregnant women in Africa



Source: WHO Worldwide Prevalence on Anaemia, <http://www.who.int/vmnis/anaemia/prevalence/en/index.html>

Iodine deficiency in Africa



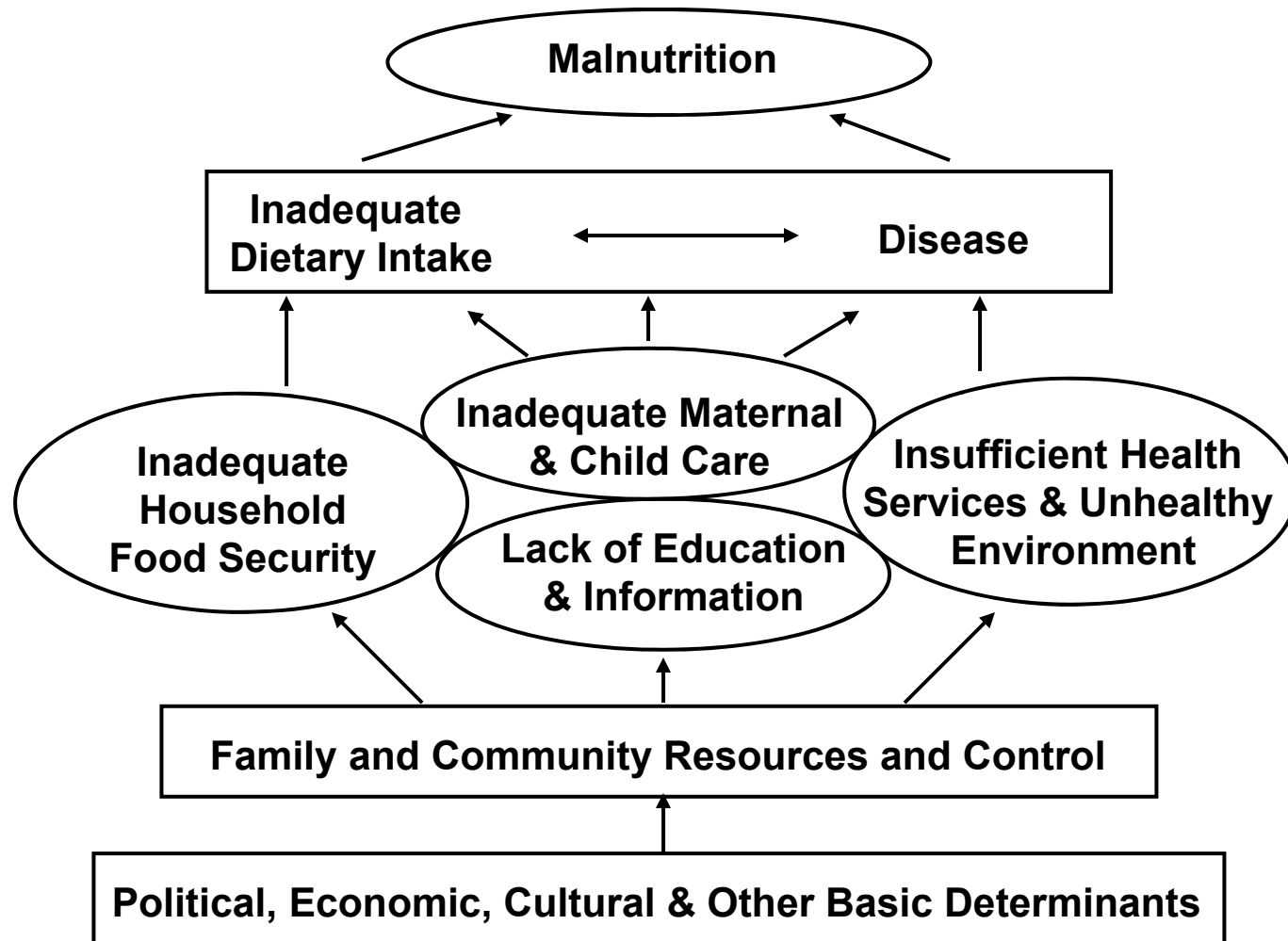
Source: WHO, Global database on iodine deficiency, <http://www.who.int/vmnis/iodine/status/en/index.html>

III. Causal Framework

Food security definition

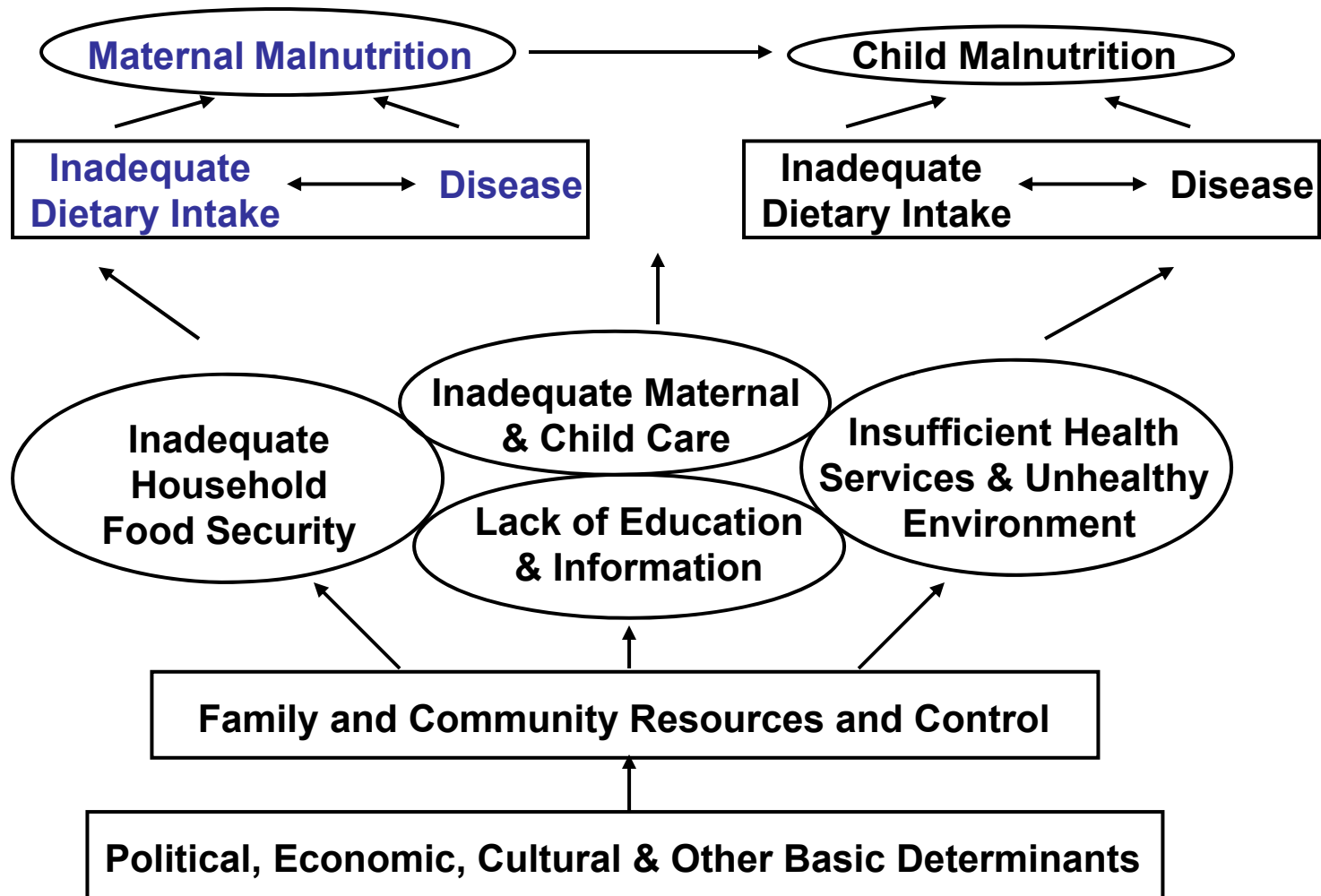
- Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious foods to meet their dietary needs and food preferences for an active and healthy life.
 - *FAO, World Food Summit, 1996*

Causal framework outlining immediate, underlying and basic determinants of malnutrition



(Adapted from UNICEF, 1990)

Causal framework with maternal and child malnutrition



(Adapted from UNICEF, 1990)

IV. Types of Nutrition Interventions

Routes to Better Nutrition – Long Routes

Supply-side incentives	Demand-side incentives	Demand-side behavior change
Primary health services, infectious disease control	Economic development (incomes of poor)	Improving women's status
Safe water, sanitation	Participatory programs, policy development	Reducing women's workload, especially in pregnancy
Policies on marketing of breast milk substitutes	Employment creation	Increasing women's education
Food, Ag policies to increase healthy foods	Fiscal, food price policies to increase purchasing power of poor	

Source: Repositioning Nutrition as Central to Development, World Bank, 2006

Routes to Better Nutrition – Short Routes

Supply-side incentives	Demand-side incentives	Demand-side behavior change
Community growth promotion programs	Conditional cash transfers	Infant, young child feeding
Community Integrated Mgmt of Childhood Illnesses (C-IMCI)	Microcredit + nutrition education	Maternal nutrition, knowledge, care-seeking during pregnancy, lactation
Facility-based nutrition, health services	Food supplementation	Hygiene education
Micronutrient supplements	Micronutrient supplements	
Micronutrient fortification	Food stamps	
Targeted food aid	Targeted food aid	
Biofortification		

Source: Repositioning Nutrition as Central to Development, World Bank, 2006

USAID Sector Allocations, FY 2007

Percent of Total Allocated to Sectors by Country

	Health	Agricult, Environ	Democ, Govern, Hum Rights	Conflict Mgmt, Human Asst	Educ	Econ Grwth	Total
Angola	57	6	25	0	0	12	100
Ethiopia	77	12	4	1	3	3	100
Liberia	4	16	24	36	14	6	100
Madagascar	59	39	2	0	0	0	100
Mozambique	82	15	1	0	0	1	100
Namibia	83	6	2	0	8	0	100
Sierra Leone	5	18	69	0	0	8	100
Somalia	0	0	61	0	39	0	100
Sudan	14	24	3	40	7	13	100
Uganda	83	9	2	1	5	1	100
Zambia	85	7	1	0	6	1	100

Source: USAID Budgets, <http://www.usaid.gov/policy/budget/cbj2007/afr/zm.html>, Oct 2008

USAID Health Sector Allocations, FY 2007

Percent of Total Allocated to Health Sector by Country

	Family Plan, Reproductive Health	HIV / AIDS	Child Survival , Maternal Health	Vulnerable Children	Other Infectious Diseases	Total Health
Angola	13	21	7	0	59	100
Ethiopia	19	69	8	0	5	100
Liberia	17	33	50	0	0	100
Madagascar	31	17	30	0	22	100
Mozambique	8	74	8	0	11	100
Namibia	0	96	0	0	4	100
Sierra Leone	0	0	100	0	0	100
Somalia						
Sudan	5	7	54	16	19	100
Uganda	5	81	2	1	11	100
Zambia	3	84	5	0	8	100

Source: USAID Budgets, e.g.: <http://www.usaid.gov/policy/budget/cbj2007/afr/zm.html>, Oct 2008

Nutrition Interventions Funded by USAID

Country	Interventions
Angola	Food rations to vulner rural hholds, IDPs (Fd Sec); food assist + nutr educ to vulner women (Gender)
Ethiopia	Nutr training for women, children (Health)
Liberia	Nutr, diarrhea control promotion (Health)
Madagascar	Nutr promotion – e.g. exclusive brst feeding (Health)
Mozambique	Nutr fd crops – e.g. orng swt pot, nutr messages, hyg + sanit info (Fd Sec/Rural Income); child Vit A supp, prenatal care (Health)
Namibia	—
Sierra Leone	—
Somalia	Nutr surv training, supp fd to maln chld (Hum Asst)
Sudan	Supp fd to maln chld (Hum Asst)
Uganda	Nutr + hygiene training (Fd Sec); fd assist to IDPs (Hum Asst); fd assist to maln chld, those with HIV/AIDS (Econ Grwth)
Zambia	School-based micronutr + deworming (Educ); child Vit A supp (Health)

Source: USAID Country Annual Reports FY 2005,
e.g. http://www.usaid.gov/locations/sub-saharan_africa/countries/angola/index.html

Nutrition activities in Mozambique

in USAID-funded food security projects

Intervention	ADRA	Africare	CARE	FHI	SCF	WVI
Breastfeeding education	X	X	X	X	X	X
Complementary feeding education	X	X	X	X	X	X
Maternal/Pregnancy diet education	X			X	X	X
Household diet education	X	X	X	X	X	X
Hygiene, sanitation practices education	X	X	Partial		X	X
Diarrheal management education	X	X		X	X	X
HIV/AIDS education	X	X				X
Deworming						
Growth Monitoring						

Source: USAID-funded Development Assistance Projects, previous cycle (2002-2006)

UNICEF/WFP Large-Scale Initiative

- Ending Child Hunger and Undernutrition (ECHUI)
- Focused on MDG #1, target 2
 - Halve the proportion of people who suffer from hunger
 - Impact indicator – underwt prevalence of children < 5yr

The Essential Package

Health, hygiene and nutrition education
plus...

- **household food security interventions**
- **micronutrient supplementation**
- **household water treatment**
- **hand-washing with soap**
- **parasite control (esp. deworming)**

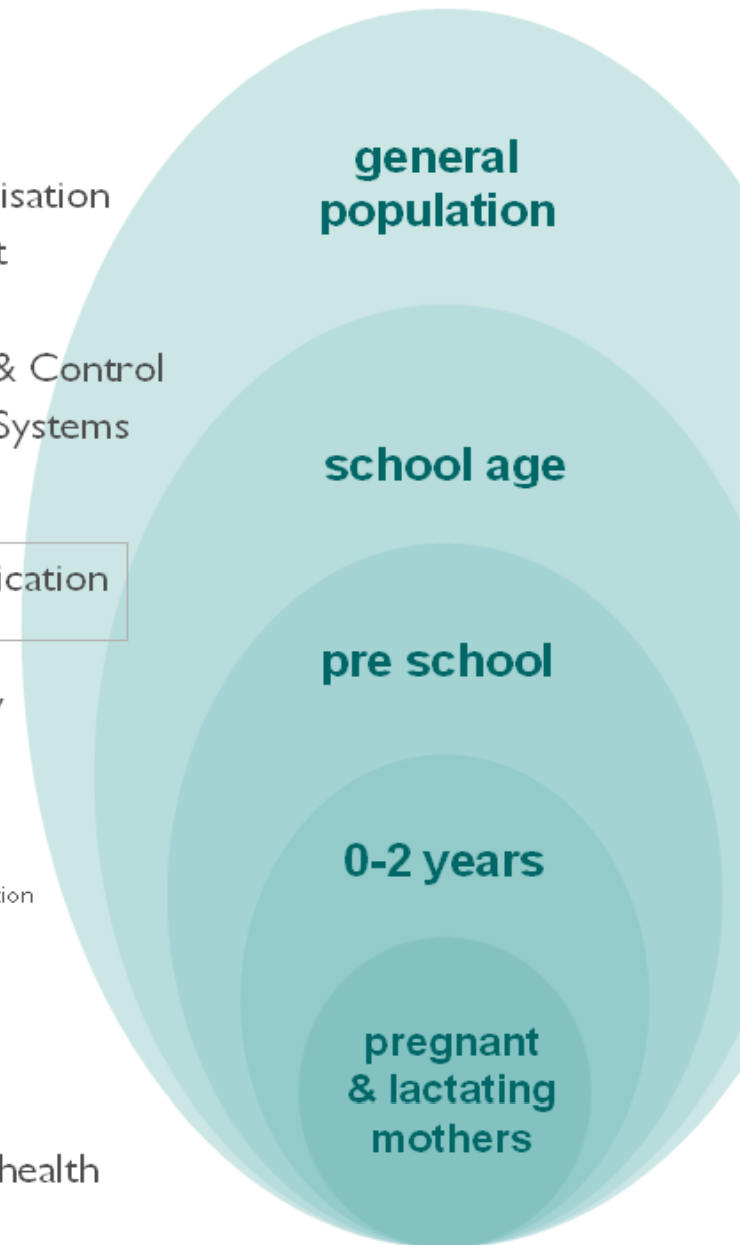
Initiative interventions that work...

Complementary interventions

- Policy & social mobilisation
- Ensure adequate diet
- HIV prevention
- Disease Prevention & Control
- Water & Sanitation Systems
- Food Security

- Micronutrient Fortification
(at the State & National Level)

- Primary & Secondary Education
- ARI & Diarrhoea Treatment
(inc. promotion of Oral Rehydration Therapy)
- Immunization
- Birth spacing
- Safe motherhood
- Other reproductive health interventions



Essential Package of interventions*

* Implemented at the household, school and community level

- Health, Nutrition & Hygiene Education (inc. breastfeeding and growth promotion)
- Supplementary & therapeutic feeding
- Micronutrient Supplementation (inc. vitamin A, zinc, iron and prenatal vitamins)
- Hygiene promotion
- Household water treatment
- Parasite control (esp. deworming)

Source: WFP/UNICEF, 2006

TSNI Nutrition Project in Mozambique

- “Towards sustainable nutrition improvement (TSNI): Addressing macro- and micro-nutrient malnutrition through new cultivars and new behaviors”
- Two-year intervention trial in 3 drought-prone districts of Zambezia, Mozambique
- Integrated nutrition, agricultural activities
- Partners: Michigan State University, GOM (Health, Agriculture), Intl NGOs (WV, HKI), Agric Research Institutes (INIA, SARRNET)
- Funders: Micronutrient Initiative, Rockefeller Foundation, USAID-Washington, HarverstPlus

TSNI Nutrition Project in Mozambique

Objectives

- Increase intake of vitamin A & energy, particularly among young children (6 months to 4 years)
- Increase vitamin A status among these children
- Intermediate objectives
 - Improve access to high-yield orange-fleshed sweet potato (OFSP) varieties that are rich in beta-carotene
 - Increase demand for OFSP, enhance knowledge & child-feeding practices of caregivers through extension service contact, use of media
 - Enhance income through expansion of area under production, market development for OFSP roots, processed products

TSNI Nutrition Project in Mozambique

Components

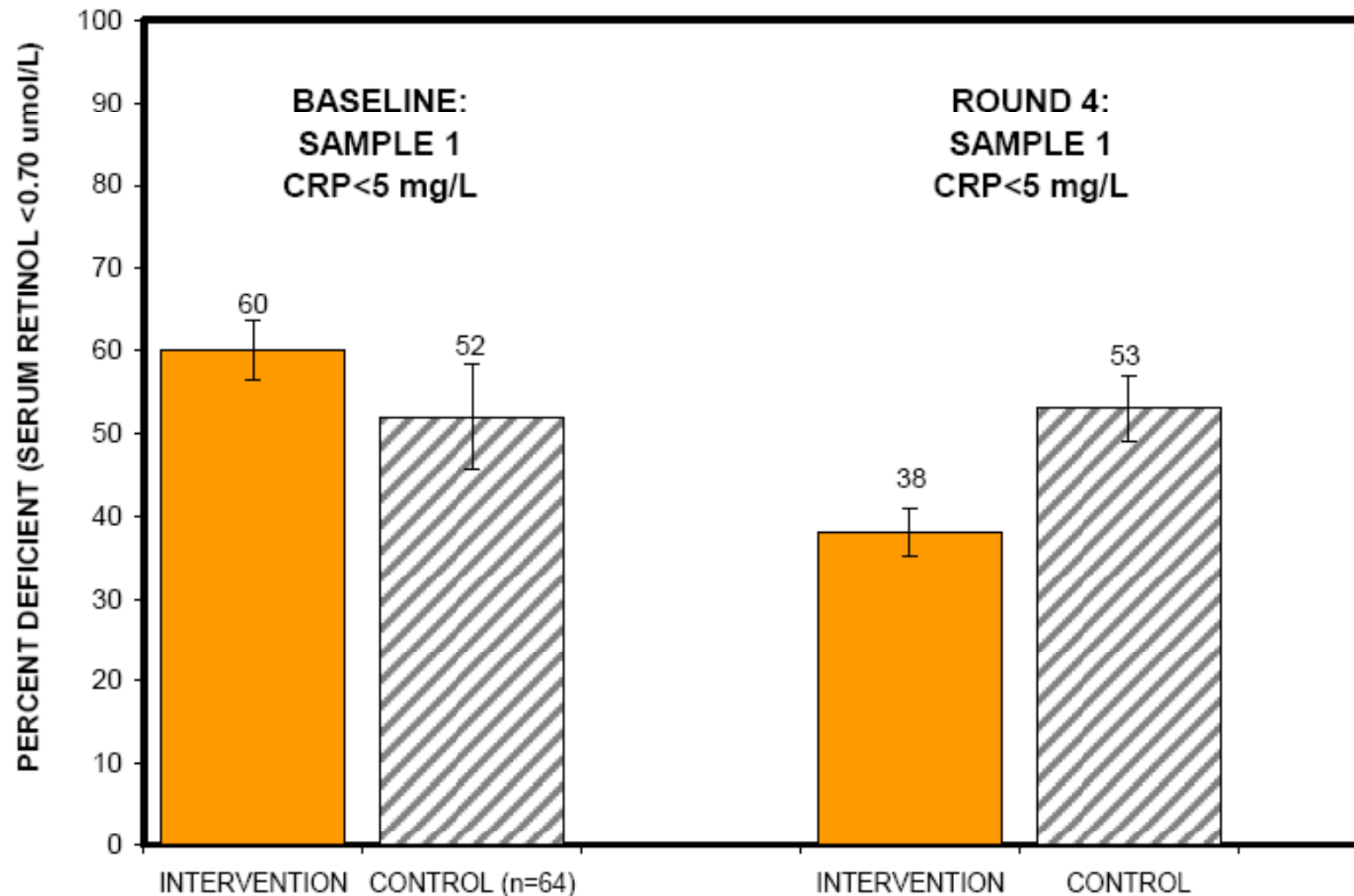
- Increasing access to high-yield varieties of OFSP
 - Introduction
 - Adaptive testing
 - Breeding
- Farmer extension
 - Agricultural, nutrition extension agents worked with same farmers' groups
 - Other communication strategies – radio, community theater, market-based advertising
 - Home nutrition education visits

TSNI Nutrition Project in Mozambique

Components

- Expanding production, market development, increased incomes
 - Via quality grades, purchasing rules, intermediary trader
- “Golden bread” recipe development, production by local bakers
 - 38% of wheat substituted with boiled, mashed OFSP

TSNI intervention children show reduction in prevalence of vitamin A deficiency



V. Parting Thoughts

Parting thoughts about intervening

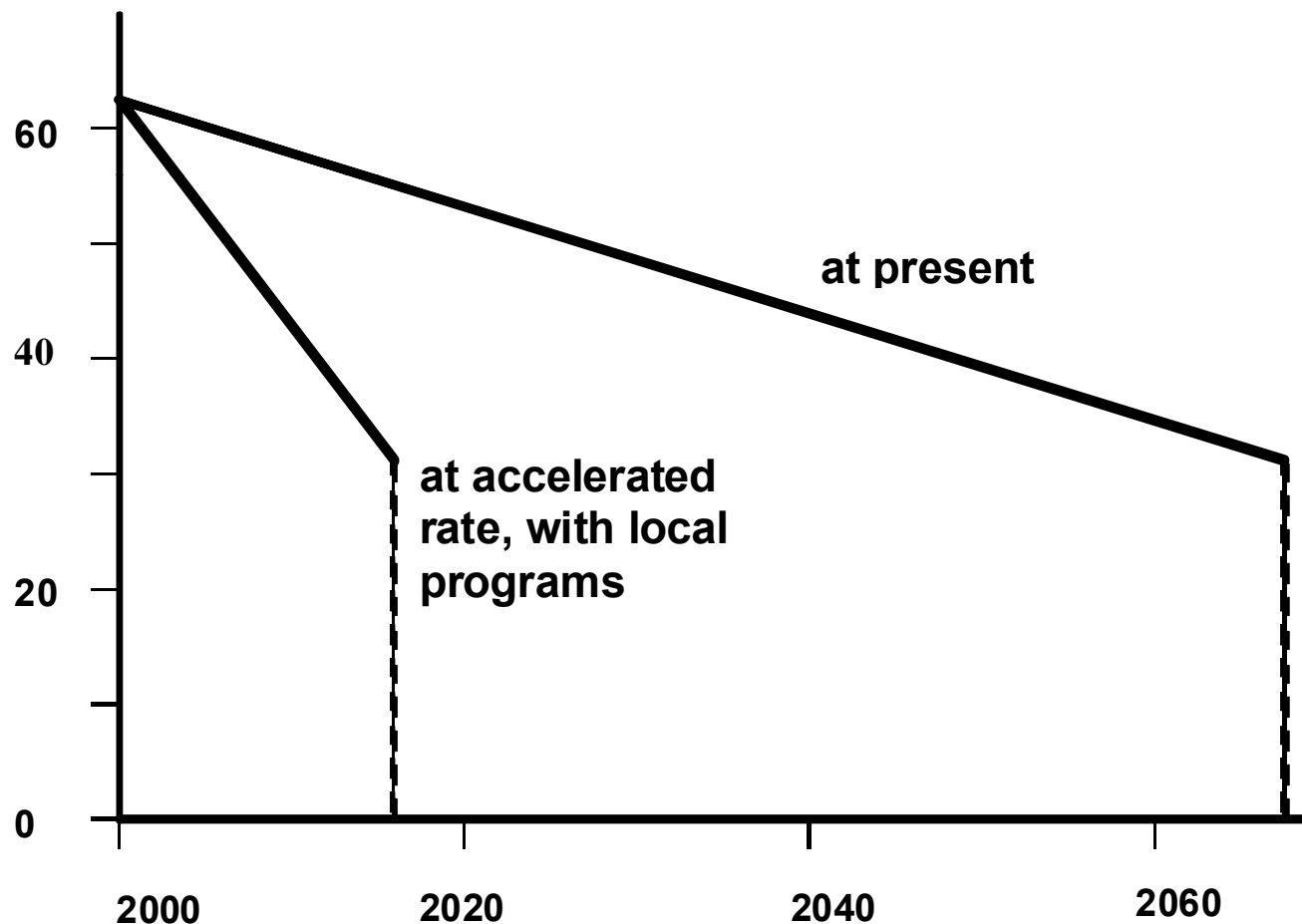
- Multi-faceted local programs, instead of sectoral centralization
- Reaching the individual – the importance of care
- Improvement, sustainability needs time

Cutting prevalence of underweight among preschoolers in half, Bangladesh

—at present rates (0.5 % points/yr)

—at accelerated rates with investment in local programs (2.0 % pts/yr)

Prevalence underweight %

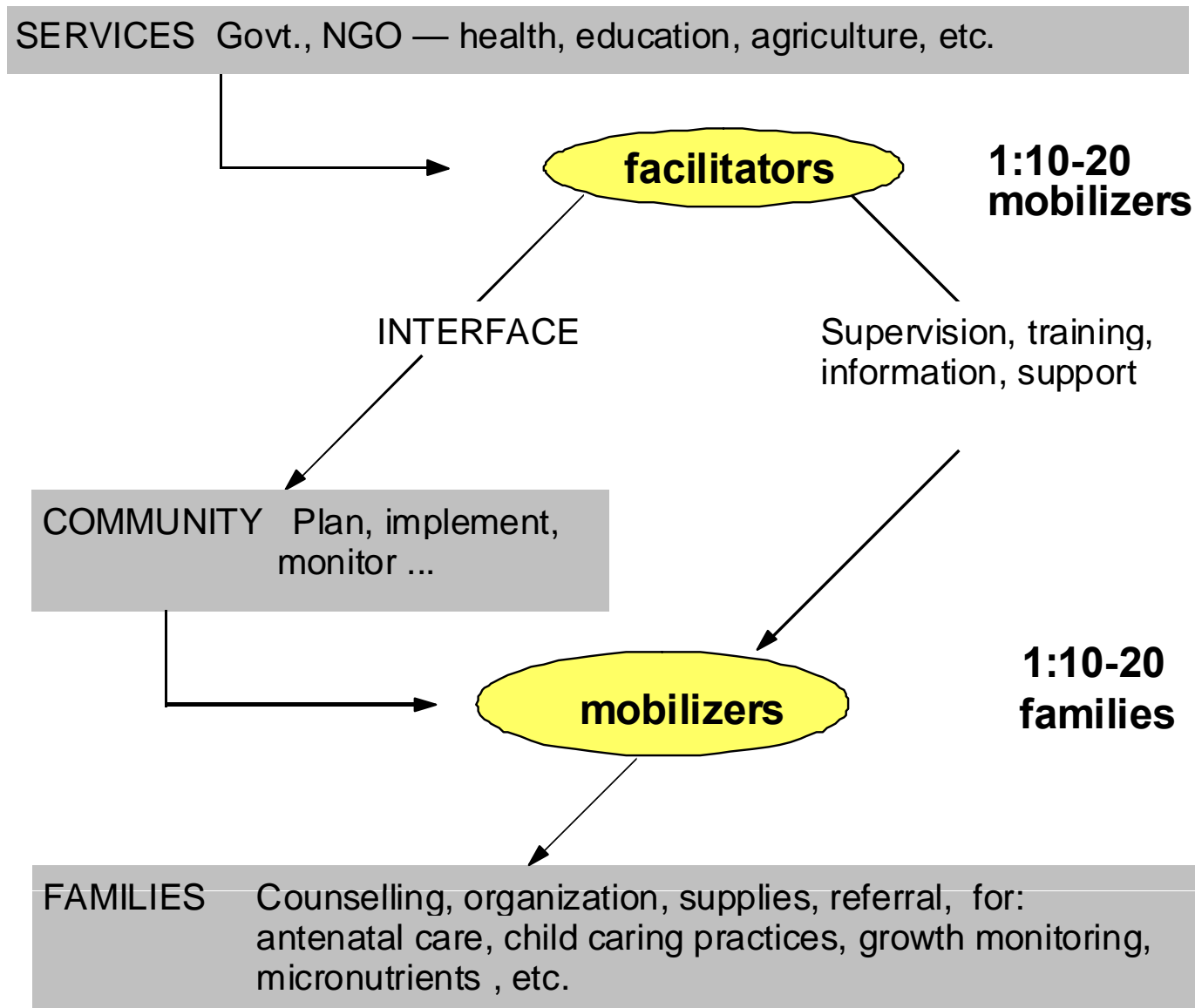


Source: Mason, 2000

Parting thoughts about intervening

- Multi-faceted local programs, instead of sectoral centralization
- Reaching the individual – the importance of care
- Improvement, sustainability needs time
- Intensity matters
 - Relation of expenditure to effect not linear
(Need to reach threshold expenditure – \$/child/year)
 - Facilitator to mobilizer, mobilizer to household ratios are important

General structure for community-based programs



Sources: Mason, 2000; Tontisirin, 1996

Parting thoughts about intervening

- Addressing HIV/AIDS

Food Insecurity, Malnutrition and HIV/AIDS

Complex intertwined relationships

- Food insecurity, poverty → migration, high-risk behaviors
→ increased risk of infection
- HIV/AIDS → reduced work → decreased food production, earnings → decreased food intake
- HIV/AIDS → increases resting energy expenditure, reduces appetite, nutrient malabsorption
- Malnourished → increased risk of opportunistic infections, shorter survival time for HIV+

Food Insecurity, Malnutrition and HIV/AIDS

Some ways to address problem

- Seek collaborations with health sector
 - HIV/AIDS training for all NGO staff, community workers
 - Labor-saving technologies/labor management
 - Promote low-labor intensity crops (e.g. sweet potato, manioc, bananas)
 - crop residues to reduce weeding
 - low-tech tools (e.g. light-weight hoes; hand-jab planter)
 - basin planting to harvest water
- (Source: www.sarpn.org.za/mitigation_of_HIV_AIDS/Mitigation_of_HIV-AIDS_Report.pdf)
- Food assistance to support holistic programming
 - Meet food security + HIV prevention/treatment/care objectives
 - Rations to families taking care of chronically ill or with orphans

Parting thoughts about intervening

- Addressing HIV/AIDS
- Invest in community programs
 - Community-based therapeutic care (CTC)
 - Community-based growth promotion (CBGP)
 - Community integrated management of childhood illness (C-IMCI)
 - Positive deviance (PD/Hearth)

(See: http://pdf.usaid.gov/pdf_docs/PDACL632.pdf)



Annual unit costs of nutrition programs

<i>Intervention</i>	<i>Unit cost per participant (\$)</i>
Community-based growth promotion ^a	1.60–10.00 without supplementary food 11.00–18.00 with targeted supplementary feeding
Food supplementation ^b	36.00–172.00 to provide 1,000 Kcal/day
Early child development/child care ^c	250.00–412.00 with food (Bolivia) 2.00–3.00 without food (Uganda)
Nutrition education ^d	2.50
Breastfeeding promotion in hospitals ^e	0.30–0.40 if infant formula removed from maternity 2.00–3.00 if not
Microcredit cum nutrition education ^f	0.90–3.50 (cost of nutrition education only)
Conditional cash transfers ^g	70.00–77.00
Vitamin A supplements to preschool children ^h	1.01–2.55
Vitamin A fortification of sugar ⁱ	0.69–0.98
Iron supplementation ^j	0.55–3.17
Salt iodization ^k	0.20–0.50

^a Source: Repositioning Nutrition as Central to Development, World Bank, 2006