

DSM Capital Market Days - Media Program

Addressing key challenges of global growth with nutrition

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Basel, 27 September 2012

From 7 billion to 9 billion

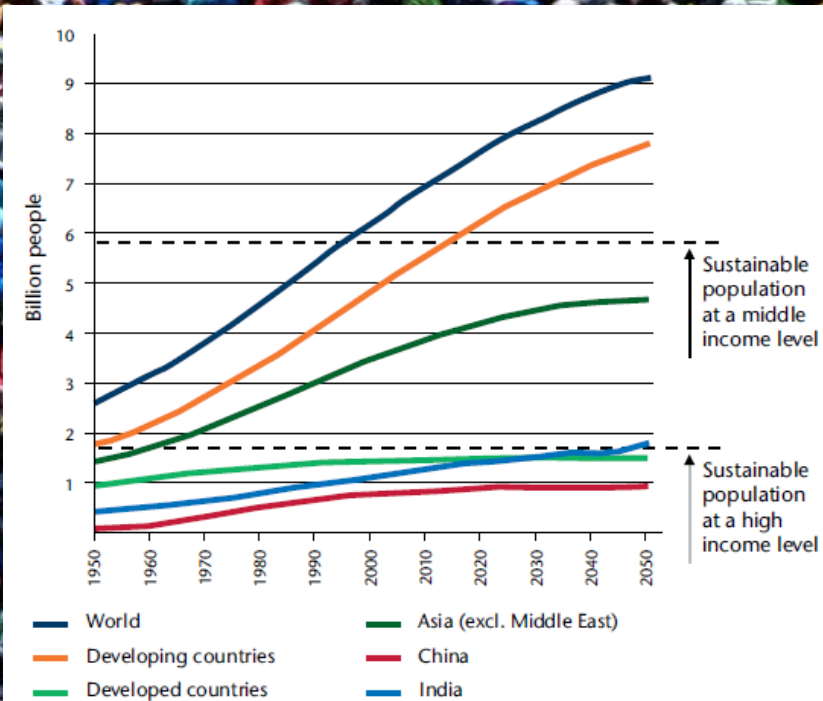


Figure 1: World population is projected to reach 9 billion by 2050; unsustainable at a middle income level (global average).

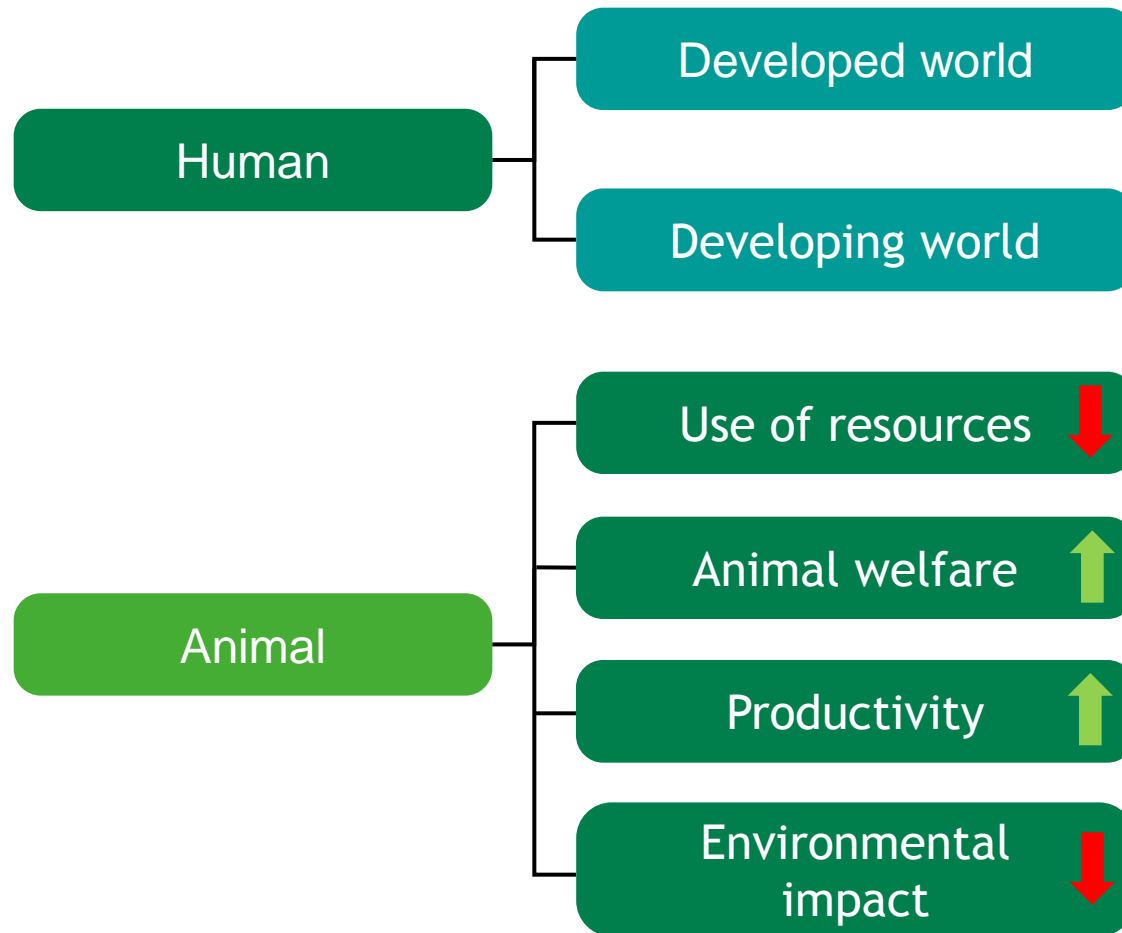
Source: World Resources Institute (WRI)/Earthtrends, 2008.⁶

Resource-constrained world

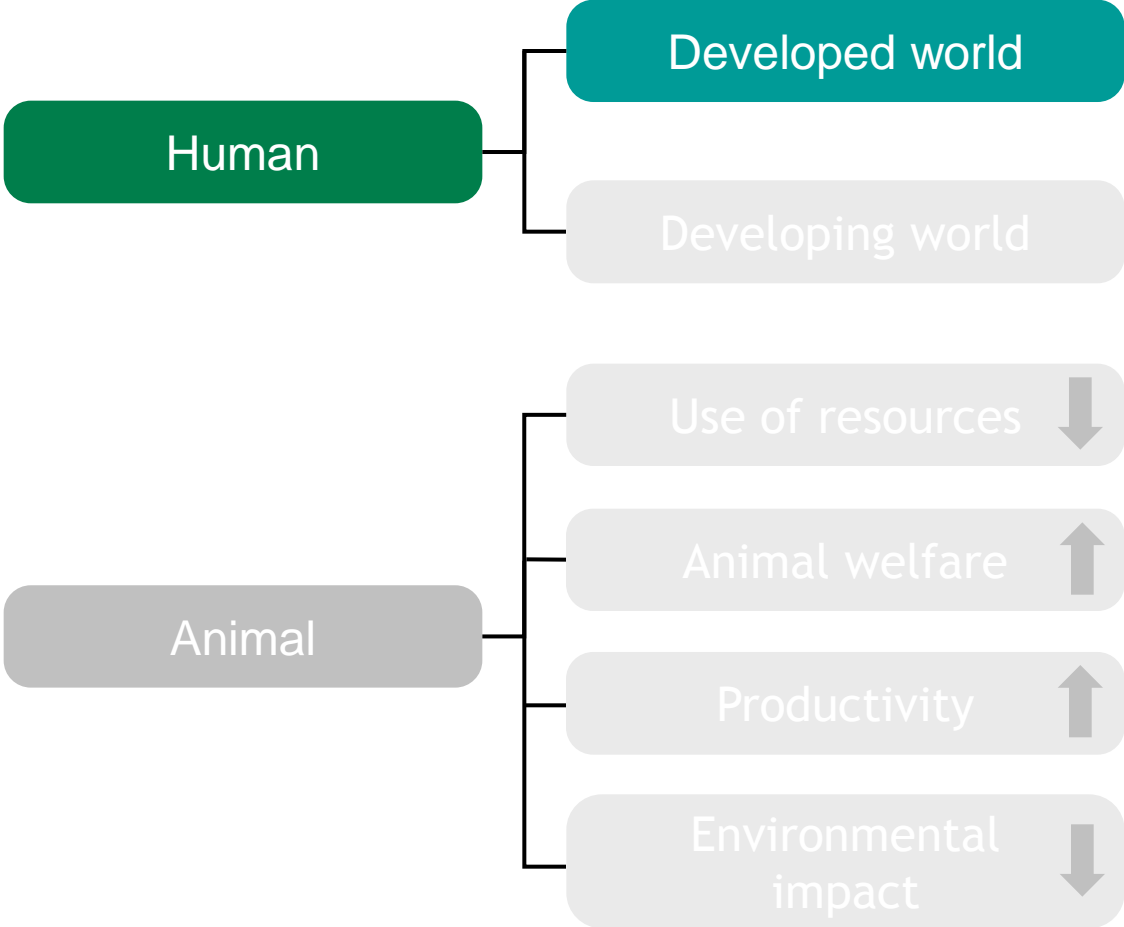
Scarcity of food,
nutrition,
land,
water,
resources,
energy.

DSM is helping to address these global challenges, for example with *nutritional solutions*, as well as with sustainable materials and bio-based products.

DSM in Nutrition



DSM in Nutrition



Longer, healthier, more active lives - DALE

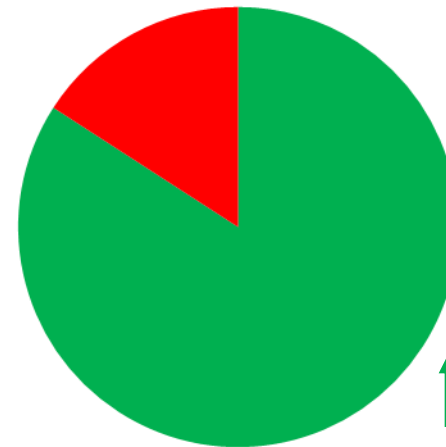
Mathers *et al.* *World Health Report 2000 Lancet* (2001) 357, 1685-1697

Country	Years*	Rank
Japan	74.5	1
France	73.1	3
Spain	72.8	5
Italy	72.7	6
Switzerland	72.5	8
UK	71.7	14
Germany	70.4	22
USA	70.0	24
Slovenia	68.4	34
Czech Republic	68.0	35
Poland	66.2	45
Hungary	64.1	62
Ukraine	63.0	70
Russia	61.3	91

*Disability-Adjusted Life Expectancy (DALE) Yrs

Life Expectancy: 80 years
Healthy vs. Dysfunctional Life

Dysfunctional
Life (9.6 yrs.) ↓



↑ Healthy Life
(70.4 yrs.)

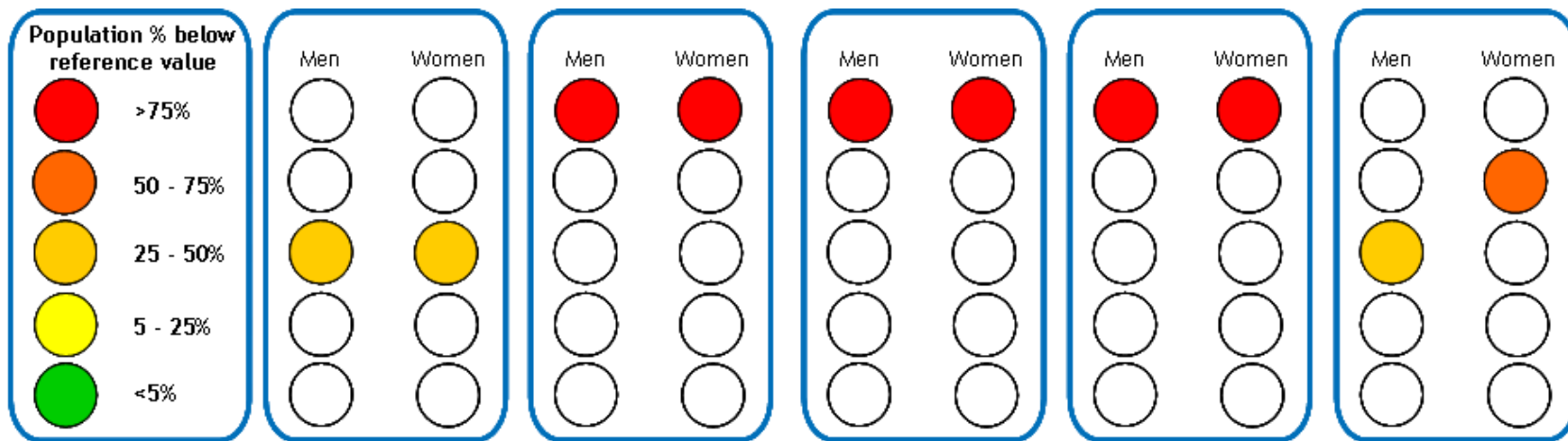
Healthy People 2010

2010 - 2050 Number of disabled older persons in and out of institutions will approximately triple!

Effect of vitamins on aging and Non Communicable Diseases (NCD)

	Vitamin A	β -Carotene	Thiamine	Riboflavin	Niacin	Vitamin B5	Vitamin B6	Vitamin B12	Folate	Biotin	Vitamin C	Vitamin D	Vitamin E	Vitamin K	Dietary AO	Multivitamin	PUFA
Aging	●	●		●	●	●	●	●	●		●		●		●		
Cancer		●					●	●	●		●	●	●		●	●	●
Dementia							●	●	●			●					
Bone Health											●	●		●			●
Hypertension											●	●					●
Diabetes			●								●	●			●		
CVD	●						●		●			●			●	●	●
COPD	●										●	●	●		●		●
AMD			●	●	●	●	●	●	●		●		●				●

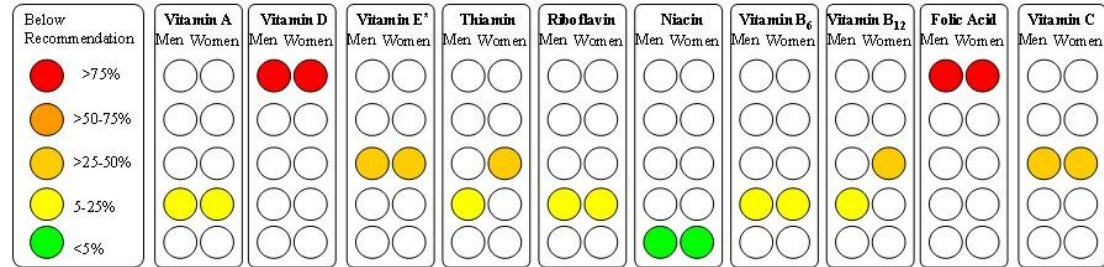
Majority of people do not eat the 'right things'!



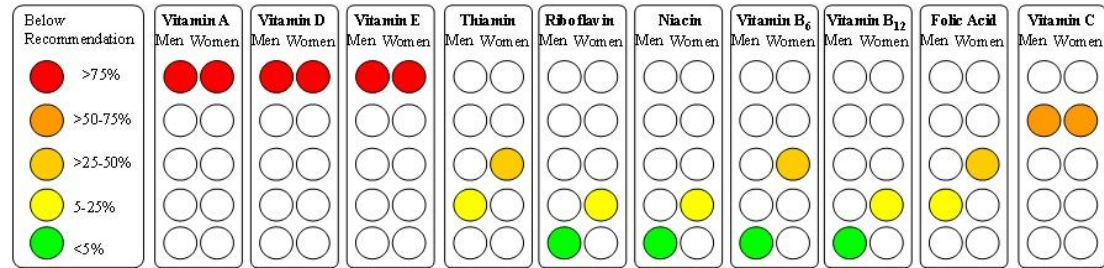
Adapted from Krebs-Smith et al. 2010 JN

Micronutrient intake is inadequate also in Western countries

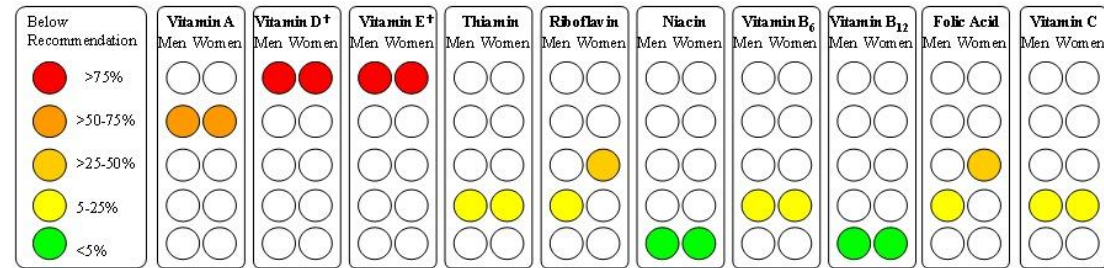
Germany



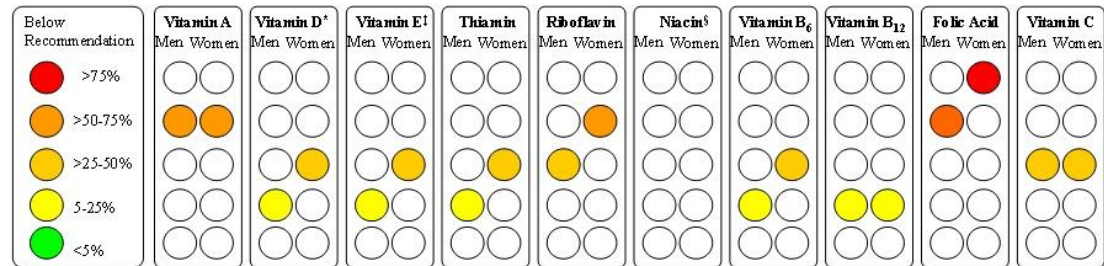
United States



United Kingdom



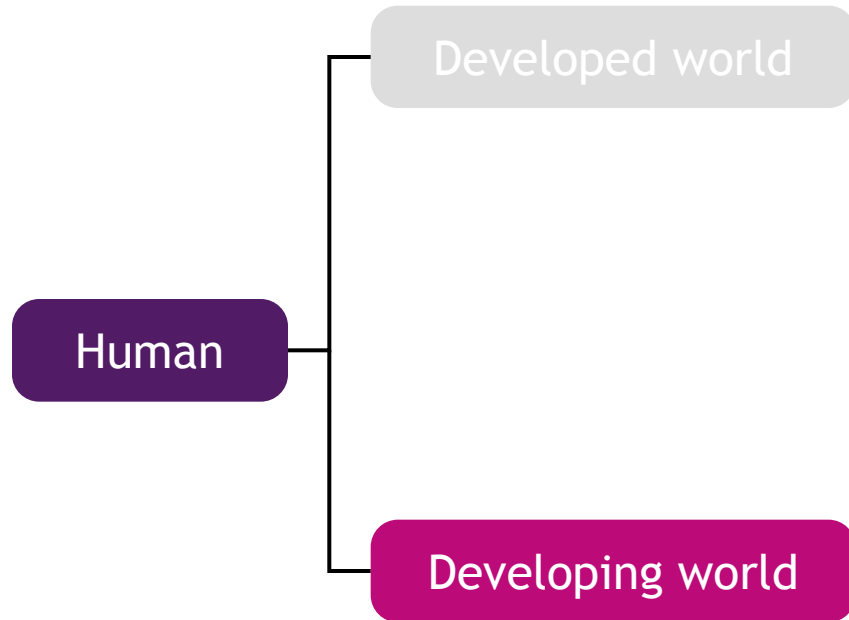
The Netherlands



Health benefit platforms drive growth



DSM in Human Nutrition



Human Nutrition, context

- 1 out of 7 people go to bed hungry
- 2 billion people live with “hidden hunger” (micronutrient malnutrition)
- 200 million children are stunted (physical and cognitive)
- 3.5 million deaths of children could be prevented with better nutrition
in other words: a plane crash every 20 minutes
- Rise of nutrition-related diseases: 366 mio people with diabetes
- 1.6 billion people are overweight and obese, increasingly also in developing world

The Burden of Knowledge: Nutrition and Cognitive Development

- Most brain growth happens in first five years, 80% in first 3 years
 - we are born with all the nerves we will ever have
 - brain develops in a clear, pre-programmed time sequence
 - special, critical periods when things develop extremely fast
- Nutrition during first 5 years and especially during the first 1000 days is critical (from conception to two years of age)
- Malnutrition during first 1000 days cannot be fixed later
- Malnutrition has key impact on NCDs later in life
- Proper early nutrition can add 2 - 3 % of GDP



The Burden of Knowledge



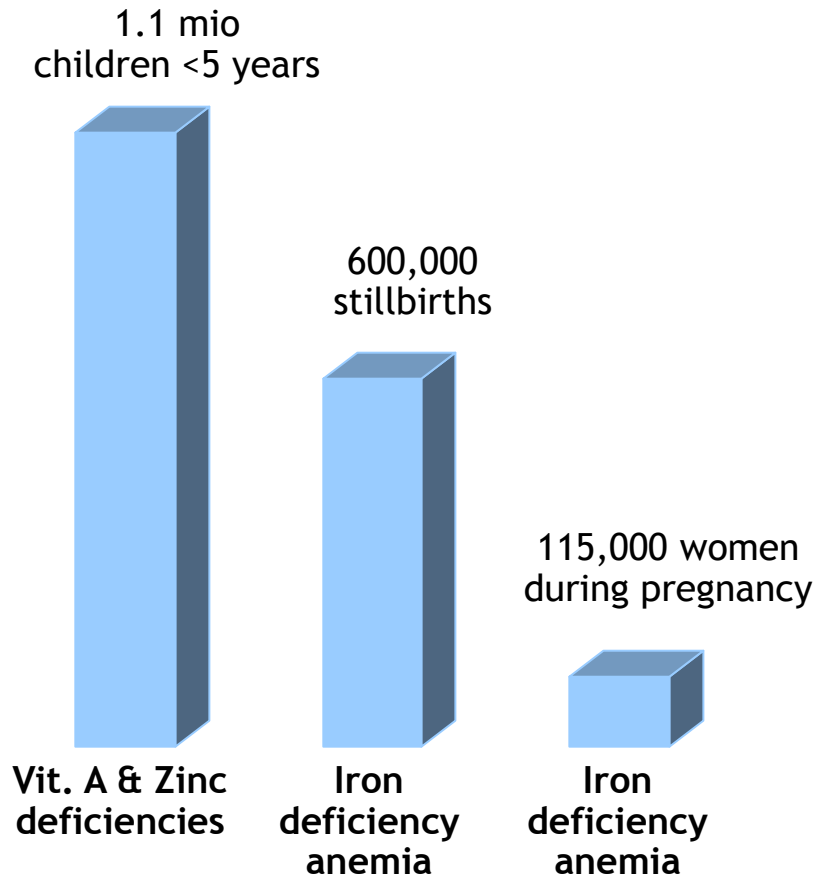
Brain neurons in normal 3-yr old



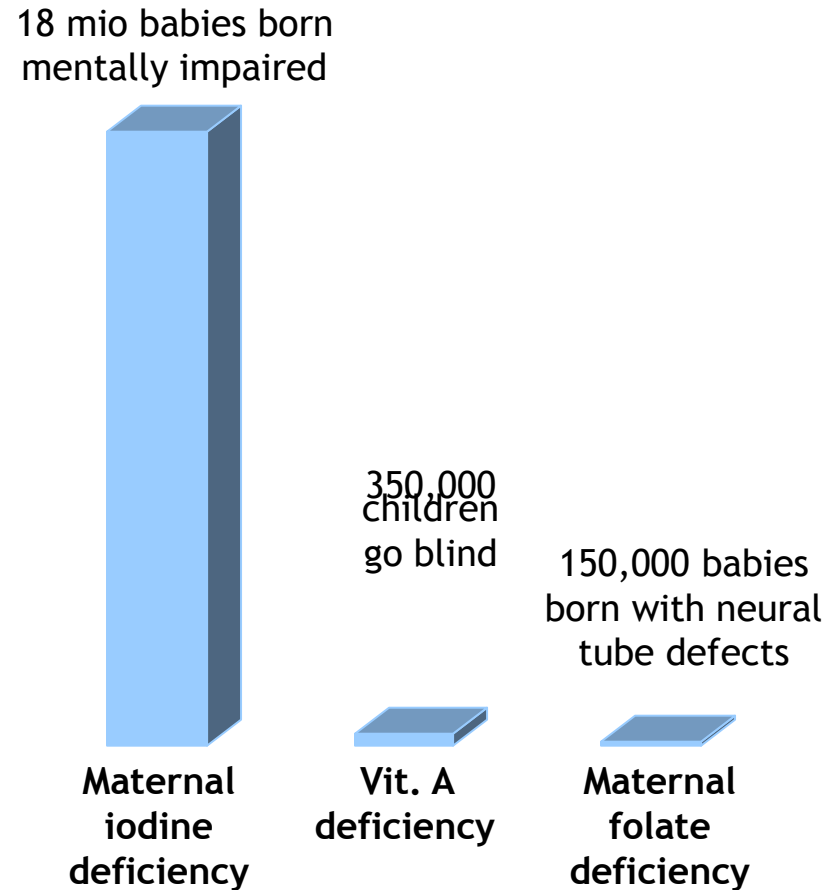
Brain neurons in malnourished 3-yr old

The Impact of Malnutrition

Annual lives *lost*



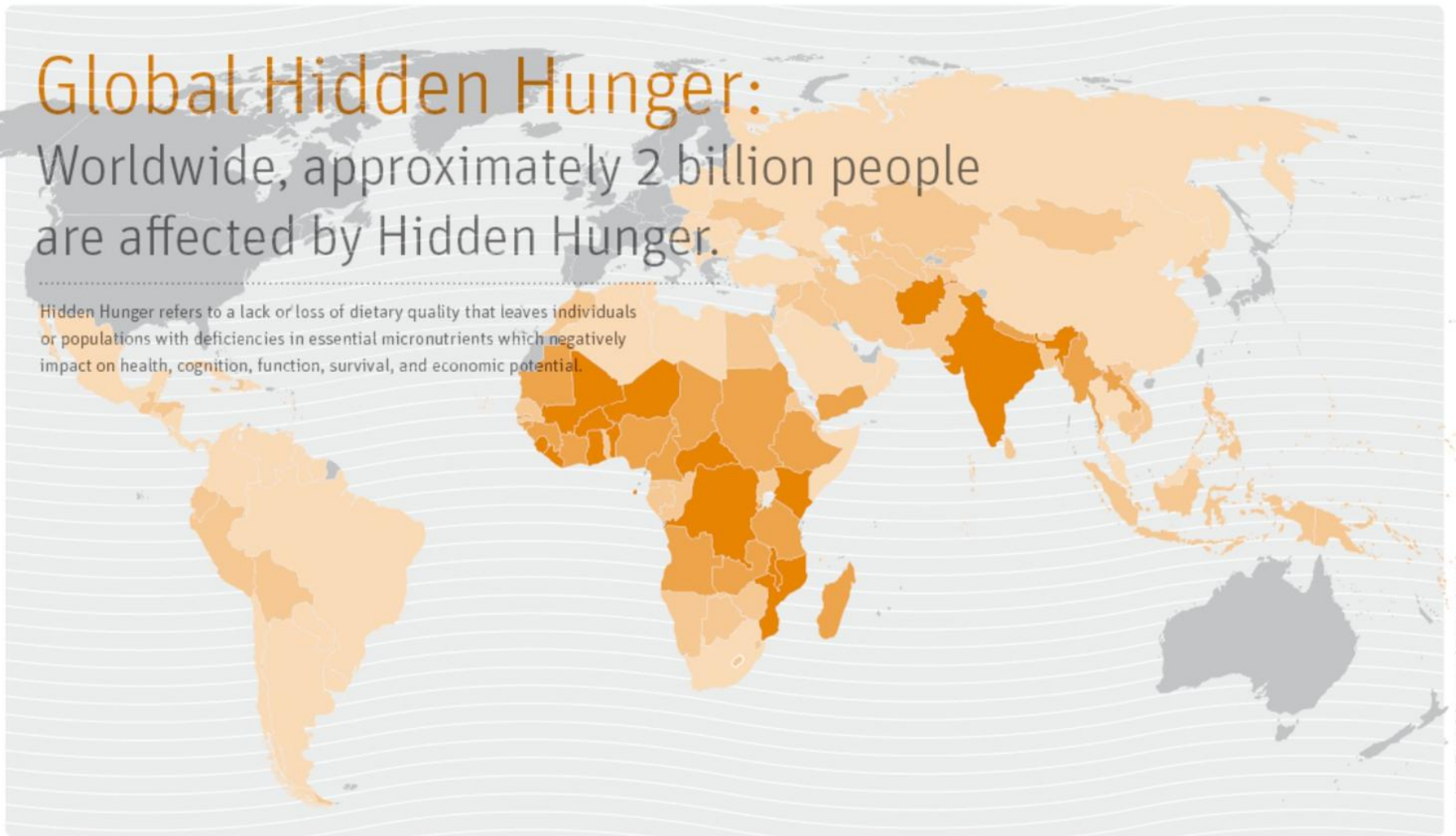
Annual lives *impaired*



Global Hidden Hunger:

Worldwide, approximately 2 billion people are affected by Hidden Hunger.

Hidden Hunger refers to a lack or loss of dietary quality that leaves individuals or populations with deficiencies in essential micronutrients which negatively impact on health, cognition, function, survival, and economic potential.



Severity of Hidden Hunger was determined based on the proportion of under-fives affected by anemia, vitamin A deficiency, stunting as an indicator of zinc deficiency and school-aged children affected by iodine.

UNICEF State of the World's Children 2009, WHO Global database on vitamin A deficiency and anemia, iodine deficiency

Magnitude of Hidden Hunger



Successful innovations addressing malnutrition



Increase micronutrient content in WFP food basket, e.g. MixMe™.



Lipid-based complementary food supplements with micronutrients/enzymes.



Innovative approaches to reduce vitamin A deficiency in India.



Innovative approaches to provide nutritional solutions

Educational programs for a balanced nutrition combined with fortification

Conventional fortification

- Staple foods (flour, sugar, milk, oil, rice)
- Dairy (milk, yoghurt)
- Spreads (margarine)
- Condiments (salt)

Home fortification

- Crushable/soluble tablets
- Powder
- Spreads

Bio-fortification

- Agricultural products (rice, maize, sweet potato,...)



Investment in nutrition pays back

DEVELOPING WORLD

COPENHAGEN
CONSENSUS 2012
solving the world's challenges



Micronutrient interventions to fight hunger ranked as the number 1 out of 16 investments that should receive top priority

GLOBALLY

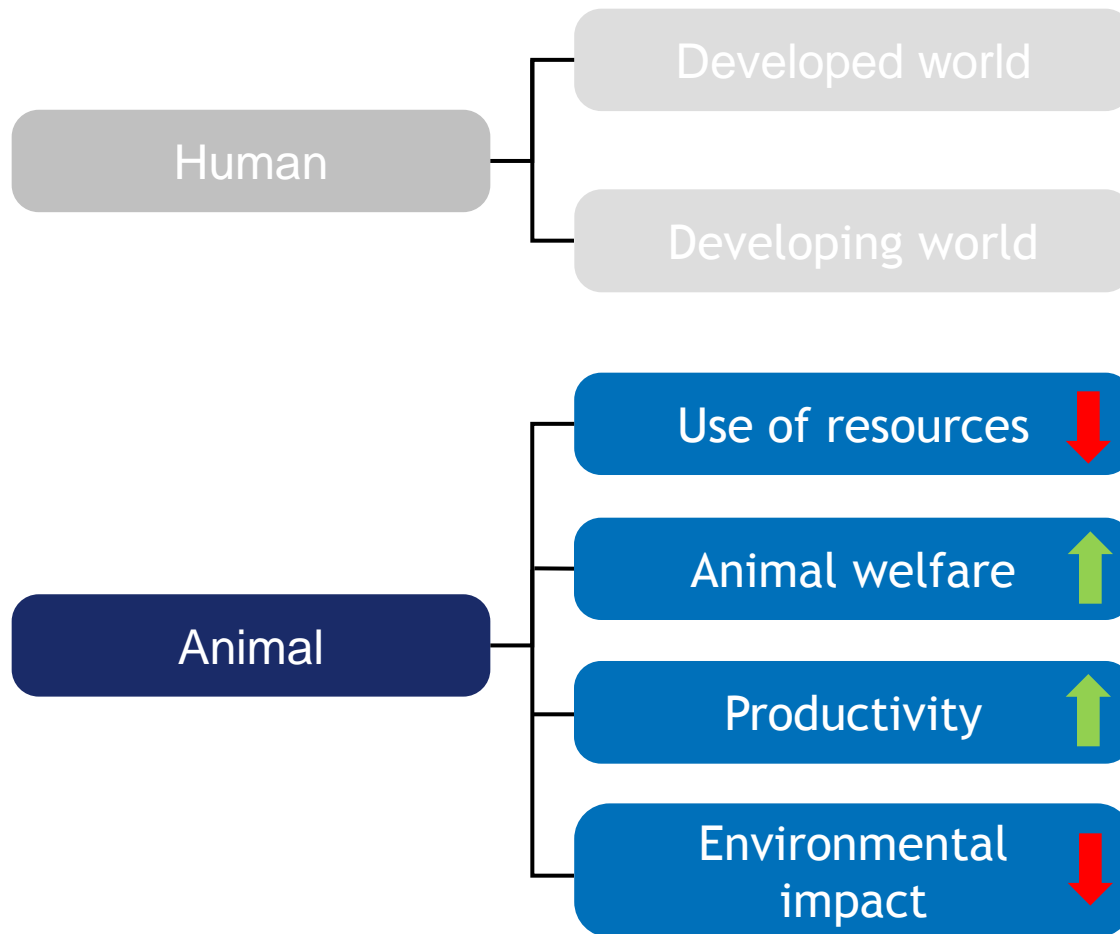


Folate fortification is in place in more than 60 countries and has reduced prevalence of neural tube defects by 50-70 %

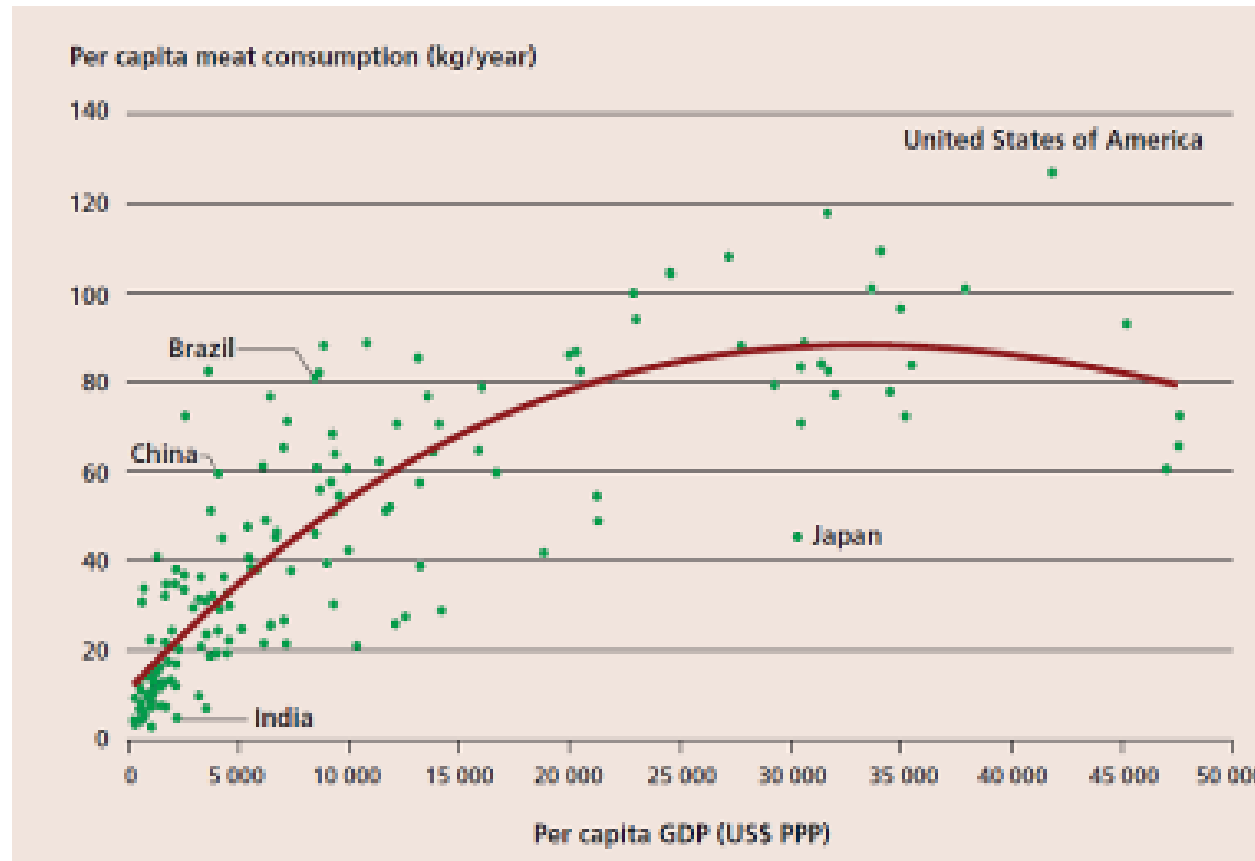
DSM Partnerships in Human Nutrition



DSM in Nutrition



GDP and population growth increase demand for animal products



Source: FAO: The State of Food And Agriculture

Challenges in animal nutrition

Optimize utilization of resources

- ✓ Develop improved & alternative feedstuffs:
 - Reduction of anti-nutritional factors,
 - by-products from industrial processes

➔ **Feed Enzymes**



Improve health and welfare of farm animals

- ✓ Reduction of morbidity/mortality:
 - Sustain health of high-yielding breeds
- ✓ Increasing longevity:
 - Extend life expectancy of breeding animals

➔ **Eubiotics**



Challenges in animal nutrition (continued)

Sustain productivity of farm animals

✓ Establish Optimum Vitamin Nutrition:

- Exploit genetic potential of high-yielding breeds
- End-products with a high nutritional value
- Productivity increase in small animal husbandry in developing countries



➔ Vitamins and Carotenoids

Reduce environmental impact

✓ Reduction of ecological footprint:

Find solutions for manure and reduce of ammonia & methane emissions

✓ Securing resources:

Close nutrient cycles (e.g. nitrogen, phosphorus)



➔ Novel Concepts

In conclusion

- Major challenge to feed a growing world population and satisfy increased demand for protein (meat, milk, egg, fish)
- Nutrition and health indisputably linked
- Investment in nutrition: guaranteed return for society
- DSM can help to address these challenges with human and animal nutrition solutions in developed and developing world
- Current DSM nutrition business 4 billion euros and growing
- DSM: Doing well by doing good



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